THE BUILDER

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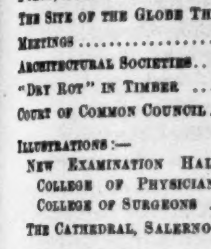
Salerno.



SALERNO, which Gibbon describes as "an illustrious city in which the men were honest and the women beautiful," although it can claim no high antiquity among Roman towns, yet as the successor and heir to the ancient Poseidonia dates back to the times of the earliest of the colonies of Magna Grecia; and the view of the gleaming temples of ruined Paestum across the opal-tinted sea is still one of the inalienable treasures of the Salernitans.

It was only after the decay of Paestum, which began in the time of Augustus, when the malarial character of its rose-covered plain seems first to have become troublesome, that Salerno grew into any prominence; and it was not until after the break-up of the Empire and the Lombard invasion that the place became important as one of the chief cities in the Duchy of Beneventum. At the time of Charlemagne's invasion of Italy this Duchy had been divided, and a member of the old Lombard reigning family had erected Salerno into the head of an independent territory, and for a time bid defiance both to the Benevento Dukes and the Frankish conqueror. It was Arrigo or Arechi II. of Benevento who first assumed the title of Prince of Salerno, and made it the capital of the province over which he ruled from 750 to 787. He not only surrounded his city with walls and strong towers, but he erected a palace which was described as "wondrous fair," richly adorned with paintings inside, and built a church dedicated to SS. Peter and Paul, on the site of a temple of Bacchus which, until that time, is said to have retained a golden image of that god. Although Arechi was ordered by Charlemagne to destroy his newly-built walls, he succeeded both in preserving them and his independence, but his grandson, Grimaldo III., had eventually to submit to the over-lordship of the Frankish emperors. Although Salerno was able to retain its semi-independence for another two hundred years, it was engaged in constant warfare with the surrounding states, and the trouble caused by these petty wars was considerably aggravated by bodies of Saracens taking part, on one side or the other, in the quarrels; and it culminated in the capture and sack of the city by the Emir Abdillo in 872. The Saracens seem to have held possession of Salerno, Cetara, and other parts of the coast for some years, and inspired the greatest horror among the inhabitants by their devastations; and this circumstance renders the evident Saracenic influence on the architecture of the neighbourhood during the following centuries the more remarkable.

In 1016 a party of forty Normans on their way to the Holy Land were at Amalfi when the Saracens were again threatening a descent on Salerno, and the then Duke, Guaimario III., besought their assistance. The result was so far satisfactory that the attack was repelled, but the Normans seem afterwards to have abandoned their intended pilgrimage and remained in Salerno, and they and their descendants no doubt prepared the way for the ultimate accession of Norman rule.

Gisolfo II., the last Lombard Duke of Salerno, had made himself obnoxious to his people by his cruelty, as well as offensive to the neighbouring princes, and Robert Guiscard, the Norman Duke of Apulia and Calabria, with a mixed army of Normans and Saracens, captured the city after a siege of eight months. That it was able to withstand the attack for so long a period shows that its walls still retained the strength which had defied Charlemagne, and considerable remains of its citadel, in an assault on which Robert was wounded, still crown the hill, some thousand feet high, behind the city. The Norman Duke made Salerno at once the capital of his Duchy and rebuilt its ruined churches, and commenced the new cathedral which was to be the tomb-house of his family until his nephew Roger, who became the first King of Naples and Sicily removed the capital to Palermo.

For the materials of his new buildings, tradition says he took what gleanings he could from the already twice-despoiled Paestum, where so thorough a sweep was made of everything valuable and movable, that scarcely any indications of the Roman colony now remain around the ruins of the Greek temples. It is also commonly believed that it was from Paestum were brought the rich marbles which still abound in Salerno, a theory which seems to be improbable since the use of coloured marbles in architecture had not become common before the date of its abandonment, while, on the other hand, the supply in Rome was almost inexhaustible, and Robert, after his capture of that city in 1084, could have had what he liked for the fetching. Indeed the exportation of its marbles and works of art was almost the only form of trade surviving in Rome, and the marble columns which adorn the cathedrals of Lucca and Pisa came from there. When the Abbot Desiderius was building his basilica on Monte Cassino he bought for it columns and blocks of marble in Rome; and Robert, with such an example before him, was not likely to neglect the opportunity of securing for his new cathedral as much of the precious material as he could carry away. And Robert brought back from Rome not only much spoil, but Hildebrand, Pope Gregory VII.,

who before his death at Salerno in 1085, consecrated the new cathedral church of S. Matthew.

The main structure of the church, as we now see it, remains practically the same as it was left in the XIth century, and though it has suffered severely from alterations and adornments in the worst of taste, we can see through them all the original edifice. The plan was that of a Roman basilican church of the period, consisting of an atrium in front, a nave with two aisles, a transept beyond an arch of triumph, and an eastern apse; and, except that chapels have been built along the aisles on either side, two apsidal chapels thrown out on the east of the transepts north and south of the main apse, and the interior covered with Renaissance plaster decorations, it remains as it was consecrated by the Pope. It was erected in honour of the Apostle S. Matthew, whose remains were discovered in 954 among the ruins of Velia, on the Lucanian coast, and were brought to Salerno by Gisolfo I. and deposited in the church of Sta. Maria degli Angeli.

The entrance to the atrium on the west side is reached by a lofty double perron of marble steps, and has the jambs of its richly carved doorway on couchant lions clawing figures beneath them, and over the entrance is an inscription in which Robert styles himself "Maximus Triumphator." The atrium measures roughly 110 ft. from north to south and 120 ft. from east to west, and is surrounded by arcades carried on twenty-eight ancient fluted marble columns with richly carved capitals, which, however, did not originally belong to the columns, and from square abaci placed above them spring much stilted semicircular brick arches of a very Saracenic form. In the centre of the atrium stood a great granite basin on four lions, brought from Paestum, which was, however, removed to the Villa Reale in Naples in spite of the protests of the Salernitans, and the courtyard has been paved with lava from Vesuvius. Above three sides of the arcade are modern buildings, but the east side, which has the centre arch wider and higher than the others, was adorned with the present balustrade and statues about 1743. At the south-east angle of the atrium stands a lofty campanile measuring about 35 ft. square, built early in the XIIth century, but only the lower stages belong to that date, the upper part having been rebuilt. The church has three western doorways, the principal one of which is square-headed, with lions on each side at the base of its highly enriched architraves, and contains a pair of bronze doors decorated in silver niello, presented by Landolfo Butromile in 1099, and is one of that group of bronze doors which were manufactured in Constantinople, of which others are to be found at Monte Cassino and Monte Santangelo.

On entering the church, which measures some 232 ft. in length, we see at once the havoc caused by the restorers and decorators in 1722. Originally the nave arcades consisted of pointed arches in brick carried on ancient marble columns, but these have been encased in piers built round them and covered with decorative plaster work much as was done to the nave of S. John Lateran in Rome. But in spite of their discordant surroundings the eye is at once attracted to the wonderful group of ambones and screens at the east end of which, for their completeness and beauty, are scarcely to be rivalled even in Italy (see plates in this issue). The two great ambones in the nave stand in their original positions, but the bases of their columns have been partially buried in the new pavement which was laid in 1872. These two ambones were set up some time before 1181, the date of the death of Archbishop Romualdus II., who presented them to the church, according to an inscription still remaining on the parapet of the northern one. The southern or Gospel ambone stands on twelve ancient granite columns, some of which appear never before to have been used as the quarry-worked fillets, left thick to protect them during transit, have been left intact, and the exquisitely carved marble capitals are also ancient, but clearly did not belong to the shafts. The marble parapets with their elaborately carved and inlaid decorations, and the eagle desk and its supporting figures, together with the magnificent Paschal candlestick, the finest of its class in Italy, and only outrivalled by the contemporary one in the Cappella Palatina at Palermo, all belong to the date of the erection. The Epistle ambone on the north side, which stands on four columns of black porphyry of inestimable value, seems to have undergone some alteration subsequent to its erection, the parapets perhaps alone belonging to that date, as the delicate carving of the capitals and spandrels would almost suggest that they were inserted when, a hundred years later, other works were carried out in the choir. The marble screens, steps, and bridges which give access to the ambones are all of their date, but have been considerably altered, perhaps when the stalls, which are of walnut intarsia, the galleries, and the organ loft were erected in 1482, or perhaps even later, when the brass and iron gates to the choir were inserted.

Within the choir on the south side stands another ambone, the use of which is now uncertain, but was probably the gift of John of Procida in the middle of the XIIIth century; and in front of it, raised on seven steps, is the throne said to have been occupied by Gregory VII. The pavement of the transepts and the marble screen walls covered with the most intricate mosaics, together with two columns of rare porphyry to carry great candles, belong to the period of Archbishop Romualdus; while an apsidal chapel, south of the great apse, with mosaics in the semi-dome, one of which is supposed to be a likeness of John of Procida, and contains his tomb, is attributed to him. These interesting mosaics and some others in the church, as well as portions of a beautiful ivory Paliotto, presented to the church by Robert Guiscard, are figured Salazaro's great work on the "Monumenti dell' Italia meridionale." Beneath the east end of the church is a large crypt restored by Domenico Fontana, containing the remains of S. Matthew and his bronze statue in the style of Bernini, the walls of which are lined with Florentine pietra dura.

Space prevents any enumeration of the beautiful tombs of various dates remaining in the church, but mention must be made of the large number of ancient sarcophagi, of which fourteen are in the atrium alone, which belong to all periods of Roman art, from that when Greek influence is clearly perceptible to the coarser work of the early Christian era. Perhaps the finest of these is one measuring 6 ft. long richly carved with the Rape of Proserpine, and belonging perhaps to the IInd century, which forms the tomb of Archbishop Carafa; while two others showing the Triumph of Bacchus, and Bacchus, and Ariadne, also contain remains of archbishops.

Of the numerous other churches, many of which are as old as the cathedral, the greater number were modernised in the XVIIth and XVIIIth centuries; but S. Domenico retains a Gothic cloister and S. Giorgio is decorated with mural paintings by Andrea Sabbillino, the pupil of Raphael, and a native of the city. A picturesque XIVth-century aqueduct on pointed arches still spans an adjoining valley, but the great school of medicine for which the place was so celebrated in the Middle Ages has passed away, and its memory is only preserved by a palace in the upper city which bears the inscription, "Largo della Scuola Salerterna."

NOTES.

The Preservation of Wimbledon Common.

ALTHOUGH a considerable portion of Wimbledon Common is now permanently preserved for the public as open country, it is not generally known that there is a good deal of open land, between this portion and Richmond Park, which is still liable to be sold as building land. The conversion of this land into a building estate would go far to ruin the open country aspect of the whole common, and great efforts are being made to raise a fund to purchase this portion of the land and dedicate it, like the rest, as a public open space under commons regulations. A deputation on the subject waited on the Lord Mayor a few days ago, and he has agreed to grant the use of the Mansion House for a meeting on the subject on the afternoon of Tuesday, April 26. The matter is important to all Londoners who wish to preserve unspoiled a tract of beautiful open country within easy reach of town. Wimbledon Common, hemmed in by a tract of small houses, would lose half its beauty and attraction.

The Set of Portland Cement.

AS DETERMINED by the Vicat needle, the time of setting of Portland cement is taken as the period elapsing between the gauging of the cement paste and the stage when the needle leaves no noticeable impression on the surface of the material. This method of testing is not only crude in itself, but also involves the undesirable prominence of the personal equation. Hence the results obtained are more or less unreliable and frequently inconsistent. A new form of testing apparatus, invented by Mr. Gary, chief of the department for testing building

materials at the Royal Testing Laboratory, Gross-Lichterfelde, makes use of photography for recording the maximum rise in temperature which coincides with the point at which the initial set of cement takes place. The apparatus is simple, consisting of a receptacle for cement paste in which a thermometer is embedded, and a photographic camera with clockwork mechanism for moving the sensitive plate in a horizontal direction. The tube of the thermometer is adjusted so that the height of the column of mercury is automatically recorded throughout the progress of the test, the result being a diagram showing the activity of the chemical reaction at all stages, and indicating by a definite peak the point of initial set. This method of testing is free from disturbing elements, and leaves no room for misinterpretation.

Cost of Brickwork.

IN a report to the Boston (U.S.A.) Finance Commission some interesting details are given with regard to the cost of brickwork in the Metropolitan sewerage system and in work executed by the Boston Street Department. Prices are based upon the proportion of 600 bricks per cubic yard, and the wages of 2s. 9½d. per hour for skilled bricklayers. The figures cited bring out very clearly the difference between day labour and contract work, and show that our costly experience of municipal works departments finds a parallel in the United States. Thus, while for sewers of different sizes constructed by the Street Department by day labour the cost ranged from 1*l.* 16s. to 3*l.* 13s. per 1,000 bricks, the cost of similar conduits executed by contract for the Sewers Commission was from 11s. to 16s. 9d. Further, during some weeks the staff of the Street Department laid as few as thirteen bricks an hour per man, the maximum by day labour being 242 an hour per man, as compared with the minimum of 94 bricks and the maximum of 570 bricks an hour per man in contract work for the Sewers Commission. It even happened that bricklaying was interrupted occasionally for a week at a time, owing to lack of prevision on the part of officials belonging to the Street Department. Taking the average for all brick masonry in the sewers constructed, the total cost to the ratepayers was at least 3*l.* 12s. per cubic yard, whereas the local cost of cement concrete would have been about 1*l.* 12s. per cubic yard. It would be a good thing to institute similar inquiry into the comparative costs of works executed in this country by and for public authorities.

"Egyptianised Clay."

DR. ACHESON, the well-known American inventor, has discovered that when straw is boiled in water it loses about 50 per cent. of its weight, and that clay mixed with the water extract of straw has much greater plasticity than clay mixed with ordinary water. In one instance he found that a sun-dried briquette made with clay and water extract of straw had a greater tensile strength than a burnt briquette made with clay and plain water. He thinks that the ancient Egyptians were acquainted with the fact that clay can be strengthened by the soluble matter in straw, and he therefore uses the term "Egyptianised clay" for clay treated with straw extract. The experiments which led to this discovery were commenced with the hope that the cause of the great difference in the plasticity of clays of similar chemical composition might be discovered. It had been observed that clays far removed from their place of origin are more plastic than those found near the parent rock, and Dr. Acheson thought that this might be due to impregnation of the clay with vegetable extracts contained in the water by which the clay was transported. He experimented with many extracts, including extract of straw, oak bark, sumach, and spruce bark, and found that when added to moderately plastic clay they did greatly increase the plasticity of the clay. These facts were mentioned by Dr. Acheson at a recent meeting of the New York section of the Society of Chemical Industry, when he was presented with the Perkin Medal in recognition of his work in industrial chemistry. Where primitive sun-dried bricks are used the knowledge that their strength may be increased by adding certain vegetable extracts to the clay may be useful, but whether the knowledge will be of any service in the manufacture of burnt bricks remains to be seen.

Water Waste.

FROM a report on the investigation in progress for the past two years in the city of Chicago it appears that the daily consumption of water has increased during the period 1890–1907 from 126 to 204 gallons per head. The results so far obtained by the Water Survey Division show that from 35 to 45 per cent. of the total supply is wasted by the neglect of owners and tenants in making repairs, that from 25 to 35 per cent. of the total supply is lost by leaks in street mains and old service pipes, chiefly the latter, and that other sources of loss range between 5 and 10 per cent. Altogether about 80 per cent. of the water delivered into the mains is absolutely wasted, or, in other words, the actual net consumption is only 40 gallons out of the nominal gross consumption of 200 gallons per head. We are glad to know that this appalling waste finds no counterpart in London and other large cities in the United Kingdom. Nevertheless, it is the fact that considerable quantities are wasted by defective taps which owners do not trouble to repair and tenants neglect because water is paid for by rate instead of by volume. The general application of meters with a minimum rate covering reasonable supplies for each tenant and excess charges for surplus quantities used (or wasted) would probably make people far more considerate than they are at present.

Resistance of Brazed and Welded Joints.

IN a recent memoir M. Ch. Fremont states the results of tests undertaken by him for the purpose of obtaining reliable data concerning the effective resistance of joints formed by brazing and welding specimen pieces of mild steel. It is very desirable that definite information should be available on this subject, because connexions by means of brazing, ordinary welding, and autogenous welding are often made with neglect of the most elementary dictates of prudence and without knowledge as to the degree of confidence which may properly be reposed in these processes. The extremely variable resistance of brazed joints is shown by the fact that the range of results obtained by M. Fremont was from 5 tons to 16 tons per square inch in the case of joints perpendicular to the axis of the specimen, notwithstanding the care taken to guard against defects. Ordinary welded joints showed resistance of from 16·5 tons to 20·75 tons per square inch for perpendicular joints, and as high as 25·4 tons per square inch for scarfed joints. Autogenous welds proved to be considerably superior to forged joints, their resistance being from 19·6 tons to 22·2 tons per square inch. It must be noted that the results quoted refer only to tension tests, the resistance to shock being much less in every class of joint, and particularly so for autogenous welds as ordinarily made. With regard to the last named, the investigations of M. Fremont leads to the conclusion that they should only be adopted where failure involves no danger or loss of security.

A Bunyan Memorial Hall.

IT is proposed to erect at Elstow, near Bedford, a Hall to be called the "Bunyan Memorial Hall," which will contain not only accommodation for public worship but also smaller rooms for school and social work, at a cost of from 1,500*l.* to 1,800*l.* So far the information furnished to us. It seems to us that such a man should be commemorated, if at all, in a building finer and more important than could be erected for such a meagre sum.

Mr. W. H. St. John Hope.

WE learn that Mr. W. H. St. John Hope has resigned the Assistant-Secretaryship of the Society of Antiquaries, which he has held for twenty-five years. No person could have been better fitted for such a position, both on account of his enthusiasm for and his knowledge of archæological subjects. As most of our readers are aware, Mr. Hope has practically been concerned in either initiating or in carrying on a good deal of archæological exploration, notably at Silchester and at Fountains Abbey. His retirement from his post at the Society of Antiquaries will not, we presume, involve any relaxation in his practical interest in archæology.

THE NATIONAL MUSEUM OF WALES COMPETITION.

ON Friday last the Council of the National Museum of Wales finally decided upon the designs submitted in the competition for the new Museum to be erected in Cathays Park, Cardiff. The plans of Messrs. A. Dunbar Smith and Cecil C. Brewer, 2, Gray's Inn-square, London, were selected, and these gentlemen were appointed architects for the new national buildings. The second premium of 200*l.* was awarded to Mr. T. L. Vesper, 16, Old-square, Lincoln's Inn; the third, of 150*l.*, to Mr. H. T. Hare, 13, Hart-street, Bloomsbury-square, London; and the fourth, of 100*l.*, to Messrs. David Milne

and S. Wm. Hepburn, 55, Southampton-row, London.

No less than 130 sets of drawings were submitted; in other words, 130 architects spent not far short of 100*l.* apiece in the preparation of finished designs, with no return on their outlay, the gentlemen above named excepted. Surely no more cogent argument could be advanced for reform in the present methods of conducting competitions. It would be far more reasonable to invite architects to submit sketch plans, whose preparation would be a matter of a week or so, from the most desirable of which the finished design could be worked out, than to enforce so heavy an expenditure in time and money on a one in a hundred chance. We may add that we have been led into these remarks by no feeling of animosity to the promoters of the competition under notice, who might be naturally averse to taking the first step in a new direction. The sight, however, of so much wasted labour, representing in money more than half the cost of the proposed National Museum of Wales itself, impelled us to the conclusion that the time is ripe for a change.

The accommodation required comprised the following exhibition galleries:—History and Antiquities, rooms amounting to 9,000 sq. ft. in superficial area; Geology and Mineralogy, a room or rooms 4,000 sq. ft.; Welsh Natural History, 3,000 sq. ft.; Zoology and Botany, 12,000 sq. ft.; Industries, 4,000 sq. ft.; Art Galleries, 6,400 sq. ft., including a sculpture gallery, 2,400 sq. ft., by between 20 ft. and 24 ft. high; Children's Room, 200 sq. ft.; and Aquarium, about 1,500 sq. ft., to be placed near the centre of the lower part of the building. Each of the foregoing departments were to be accompanied by rooms for reserve collections and small rooms for research students. The administrative portion was to contain a boardroom for 100 persons, director's room, rooms for the keeper of each department in proximity to the collections under his charge, workrooms for each department, library for 20,000 volumes, workshops, two in number, about 600 sq. ft., macerating room, sterilising room, lecture theatre, to hold at least 500, and a refreshment-room, with a kitchen, recommended to be placed at the top of the building.

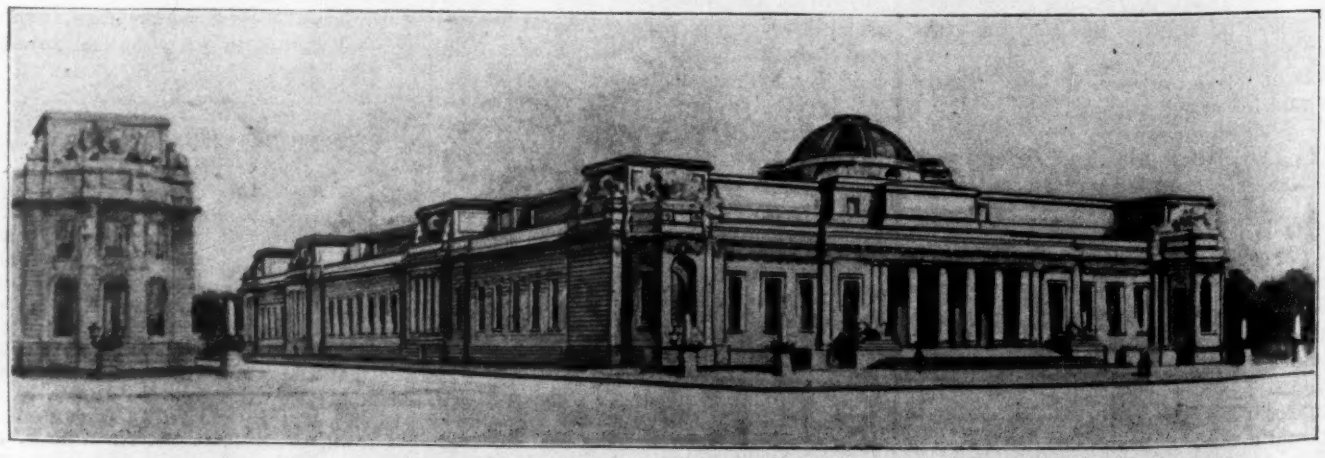
The cost of the completed building was to be 250,000*l.*, inclusive of carving, but exclusive of decorative sculpture, which might be presented later, and for which positions were to be provided by the architect. We extract the following from the conditions:—"From the position of the site on the east side of the City Hall and the relation of the Law Courts on its west side to that building as a centre, it is thought desirable that externally the Museum building should be designed in harmony with these buildings, that so far as possible it may be in sympathy with the general scheme adopted."

We are glad to find ourselves in entire agreement with the choice of the assessors, Sir Aston Webb, R.A., Mr. J. J. Burnet, A.R.S.A., and Mr. Edwin T. Hall, F.R.I.B.A., who have chosen a scheme which, to an architect's eye, is fascinating—a scheme, moreover, which keeps well within the stipulated cost, cubed at a reasonable price.

The salient feature of Messrs. Dunbar Smith & Brewer's plan is the garden court from which the public galleries are lighted. The galleries for the reserve collections, to which only students will be admitted, are parallel, and back to back with the public galleries to which they are attached, and occupy the external sides of the building. Additional accommodation is obtained for the reserve galleries by arranging a mezzanine floor, which, by the way, will in places cut across the middle line of the external windows, which are so designed as to produce the impression of a single story building. The workrooms, keepers' rooms, and research-rooms for each section are placed in direct connexion with their respective reserve galleries, with easy access to the public galleries. The lecture theatre is placed in the centre of the east elevation, forming a semicircular projection, and is arranged with entrances independent of the rest of the building. The main entrance is in the centre of the south elevation, marked by a recessed Doric portico. This is exactly the solution which fits the site, this front lining with the adjacent Law Courts and City Hall, whose cornice level will be preserved by the new museum. Passing under the portico, the main doorway opens into a spacious entrance hall, at the east and west ends of which are placed the main stairs; on either side of the portico are the Children's Museum and refreshment-room, which are entered from the south-east and south-west corners of the hall. The entrance hall is lighted from the internal court; the block forming the southern extremity of the building will thus be seen to consist of the Children's Museum, portico, and refreshment-room, occupying the front elevation and immediately behind the entrance hall and staircases, occupying practically the whole length, from east to west.

The blocks surrounding the central court are occupied internally by the Gallery of Industries, on the west, and the Geology and Mineralogy Galleries on the east. The northern portion is occupied in the centre by the north staircase hall, opening out of which on either side are the Galleries of History and Antiquities, which also extend down a portion of the eastern and western sides, where they open respectively into the Geology and Industries Galleries. This range of galleries forms a broad artery of communication round the whole building; externally runs the parallel belt of reserve galleries we have mentioned above. Dividing the central court into three parts, the northern third is occupied by a pavilion containing the remainder portion of the space required for the Galleries of History and Antiquities; the southern third by a similar pavilion containing the Natural History collection. The centre third is occupied by a garden court, flanked on the east and west sides by open areas lighting the basement. This garden in the centre forms the roof of the aquarium, thus excellently placed, as the conditions require, "near the centre of the lower part of the buildings . . shielded as far as possible from the influence of external changes of temperature." On the first floor are placed to the north the Art Galleries, coming over the Galleries of History and Antiquities on the ground floor, the Botanical and Zoological Galleries being placed over the Galleries of Industries, and the Zoological Galleries over the Galleries of Geology and Mineralogy. The southern block is occupied by a circular court-room, admirably placed in the centre of this, the administrative portion of the building. The reserve galleries are arranged externally, as on the ground floor, sufficient space for them being obtained by arranging a mezzanine in this portion. The lavatories are placed in the basement. It is contemplated that about one-third of the building will be erected in the first instance, and this portion will have to house temporarily all the six departments. The annexed sketch plan will show the extent of this first third, the temporary arrangement of which is shown on their drawings by the authors.

The elevations are dignified, though not remarkable. An endeavour has been made to harmonise, without plagiarism, with the adjoining City Hall. The angle pavilions resemble those of the latter building in outline, but the strength of Messrs. Lanchester & Rickards' design is turned to weakness by their one-story treatment. The point we mentioned above, the mezzanine floor running across the great windows on the north elevation and portions of the east and west elevations, is certainly a fault. The dome is too squat, and the blank attic story above the main cornice very heavy in appearance. The west front being longer than that of the City Hall, which it faces, projections have been placed centrally both with it and the road to the north of it. In criticising the elevations, however, it must be remembered that it was thought desirable by the authors to preserve the plinth, cornice, and parapet heights of the adjoining building. In general we would like to state that in our judgment this is the best scheme of any submitted, and is marked by a practical attention to requirements absent in many others; for example, the freight lifts are placed in direct communication with the broad galleries which form the main arteries of the building, an important point, when we consider the bulky and valuable nature of the objects likely to arrive from the reception court, which is placed at the northern extremity of the basement, approached by easy cart-slopes. The cost works out in round numbers to 240,000*l.*, for the building itself, exclusive of boundary walls and layout, cubed at 1s. above ground-floor, and 9d. below.



Perspective View of Selected Design for New Museum of Wales. Messrs. Smith & Brewer, Architects.

Mr. T. L. Vesper's design is, by comparison, somewhat scattered and illogical. The main entrance is placed on the west side. A small court is formed in the centre of the building, in which is placed an octagonal erection containing on the ground-floor the largest of the galleries of History and Antiquities, and on the second-floor the lecture theatre. On the ground-floor this octagonal building forms practically the central hall. The plan contains no main arterial communication, and the course of a bulky article just received from the freight lift would be fraught with many perils to itself and the walls of the corridors it would have to pass along. The reserve galleries are made of equal importance with the public galleries, and the keepers' and research rooms, not in every case sufficiently near the reserve portion. The administrative portion occupies most of the eastern side. The Aquarium does not seem to us very well placed. All the public galleries with the exception of the Art galleries, are on the ground-floor. The restaurant and library are on the first-floor. The elevations are tolerable, but not very remarkable. Altogether, however, it is a fairly compact scheme, though not very pretty on plan.

Mr. H. T. Hare has hit upon the noble idea, a great central hall, two stories in height, running from south to north, the principal entrance being on the south. This central hall forms the Geological and Zoological Galleries, and is terminated to the north by the north stairs and refreshment-room which occupies most of this elevation. The lecture theatre is well placed for independent use. The freight lifts are not very conveniently placed. A tower is placed over the centre of what we may term the great hall, which would form a fine architectural composition. The south elevation consists of two angle pavilions connected by a colonnade of coupled Doric columns forming an entrance portico. The design of these pavilions is not particularly happy, we do not care for the voussoir jointing of the entablature. The blank wall over the ground-floor windows is overpoweringly heavy in appearance, though perhaps preferable to a make-belief one-story treatment. The design is exceedingly monumental and dignified, in spite of these objections—perhaps only a matter of personal taste.

Messrs. Milne & Hepburn have disposed their plan irregularly in two blocks, the buildings surrounding their reception court forming a square-growing out of the north-eastern angle of the main group. The main entrance is on the western, or Museum-avenue front, leading to a vestibule and central hall, from which access is gained to the public galleries. The children's room is placed in the basement, not an ideal position, as also the refreshment-room, aquarium, and lavatories. The photographic room is also in the basement, we should say about the worst position that could be found for it. The administration department is contained on the first floor. The freight lifts are here, too, not in the most convenient position. The plan, however, possesses a concentration and compactness which entitle its authors to the award which they have gained.

The great mass of the remaining designs limits of space compel us to pass over, mentioning only those which struck us more particularly as containing points of interest. We expected something daringly original of Mr. A. Gilbert Scott, and we were not disappointed. Grecian Thompson himself was not a more daring Hellenist than this design shows Mr. Gilbert Scott to have become. A great central hall, after the manner of Mr. Hare's scheme, runs from north to south, connecting the two main blocks; on the east and west sides are placed the reserve galleries, planned on a bold segmental sweep, exhibiting externally their convex sides, a Greek Doric colonnade (we can hardly call it a peristyle, for it is occasionally interrupted) surrounding the whole. The central hall runs above the rest of the building, somewhat in the manner of the baths of Caracalla, terminating at the southern extremity in a Doric portico perched aloft, the bases of whose columns are concealed by the main parapet. The author has, we think, treated his order too elastically, lengthening and shortening his shafts to suit the occasion, and in one case, brutally breaking his entablature. The reserve galleries are too much cut off, and the plan generally is not the most convenient. Architecture, however, would not be the poorer, if we had a few more pencils as bold as Mr. Scott's.

Messrs. Lanchester & Rickards submit two schemes, one of them most attractive. In this they have made the first floor a genuine "piano nobile," placing all the public galleries on this floor. The administrative portion is excellently placed, on the right-hand side of the entrance (which is to the south), the corridor leading to the public galleries, branching off to the left. The elevations are in the "grand manner," comprising a central dome and two towers on the eastern elevation.

Mr. J. B. Fulton has adopted the great central hall idea, running from north to south, in his very interesting design. His main order is a definitely Greek Ionic, which clashes with the rather un-Greek detail of the windows.

Messrs. C. H. Reilly, H. M. G. Wood, & H. O. Burroughs have produced some very beautifully-drawn elevations of an academical type of daring. The plan has some good features

Messrs. Tanner, Clapham, & Green have marred an otherwise fine plan by the independent and comparatively irregular planning of the administrative portion, which follows the sloping line of the site on the eastern side. The elevations are dignified.

Messrs. Macartney, Halley, & Bacon's great Corinthian order is most imposing. The large sculpture hall is a fine idea.

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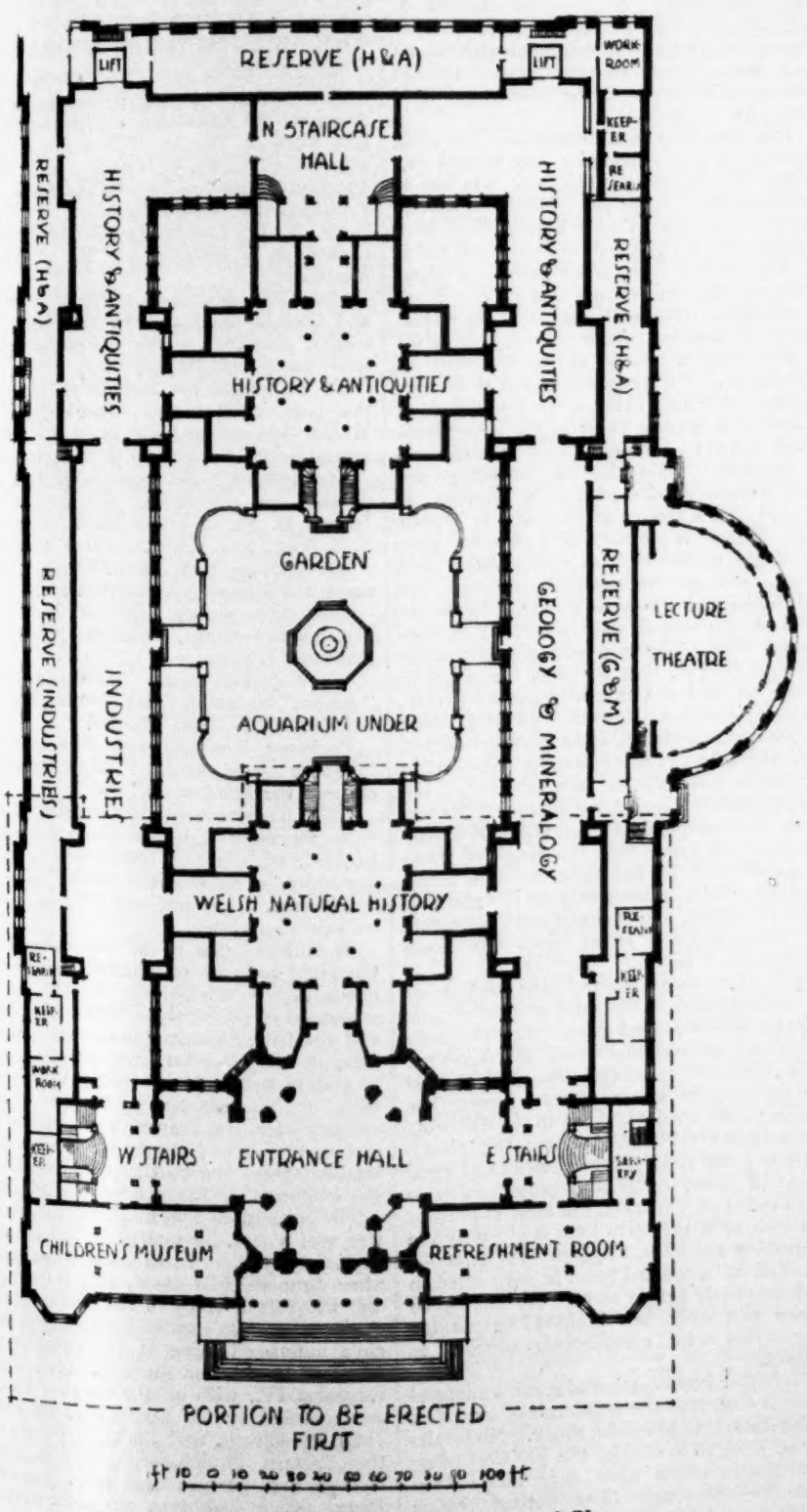

Proposed New Museum of Wales. Ground Plan.

Messrs. Pearson & Milburn place their entrance on the west, with a hexastyle Ionic portico and dome over. The perspective is most attractive

The designs will remain on exhibition at the old Town Hall, Cardiff, till April 2.

THE WORK OF THE NATIONAL PHYSICAL LABORATORY.

AT the Annual Meeting of the General Board of the National Physical Laboratory various reports were received showing the progressive usefulness of the institution during the past year and the need for further support from Government to provide for the erection and equipment of the additional buildings which are so urgently needed.

In the Thermometry Division several tests have been made on firebricks to determine the point at which they soften under small load. For this purpose an electric furnace was employed, but owing to the difficulty of cutting small samples of the material arrangements are being made by which tests can be conducted on entire bricks under definite load while uniformly heated up to 1,700 deg. C. When forthcoming, the results will be of direct value to architects and engineers concerned in the design of furnaces and other structures exposed to high temperatures.

In the Metrology Division the most noteworthy features of the past year were the consolidation of apparatus and a gratifying increase of test work. New apparatus has been designed, new gauges have been obtained, old apparatus has been recalibrated, and the final reorganisation consequent on the occupation of the new building has been completed.

The building in question was designed with special consideration of the constant temperature essential in the main measuring-rooms, and includes a long corridor, where tape measures can be tested. All the rooms are of the double shell type, the walls and double glass ceilings being entirely within the outer walls and roof. The latter has a double-glazed north light, and there is a double wall at the south side. The heating apparatus is provided with automatic thermal regulation, which plays an important part in maintaining the even temperature necessary in the case of delicate measurements.

In the corridor a base is laid out with graduations up to 50 metres, where the standardisation of measuring tapes is carried out both on the flat and in catenary.

Tests of pipe couplers have yielded some particularly interesting results. This investigation, undertaken for the Engineering Standards Committee, had for object the determination of the position of the gauge diameter of pipe threads as actually manufactured, and the interchangeability of commercial work. To test the latter all possible combinations of specimen pipe ends and couplers submitted by several firms were fitted together, with the result that 78 per cent. were found to be satisfactory, a record which ought to be welcomed by users of screwed pipes for steam, water, and gas.

The Carpentier invar wires used for the measurement of the Semliki Valley base in Uganda in connexion with the determination of the length of the arc of the 30th meridian, were sent to the laboratory for verification and determination of their coefficients of dilatation, the result being that inconsistencies were discovered, explained by the fact that the ingot from which the wires were drawn was not homogeneous.

Among other valuable aid rendered by the Metrology Division has been that of advising as to the apparatus for the equipment of a 24-metre mural base at the headquarters of the Indian Trigonometrical Survey, and the conduct of special experiments at the suggestion of Sir David Gill in connexion with the same geodetic work. The important work on screw gauges carried out for the Engineering Standards Committee has been continued, and, thanks to the generosity of Sir Andrew Noble and the Institution of Mechanical Engineers, an extensive set of screw gauges and two large measuring machines have been added to the equipment.

In the Engineering Department a number of researches more or less directly connected with practical architecture have made good progress.

Dr. Stanton has been busy investigating the effect of wind pressure on structures, a subject whose bearing upon architectural construction is illustrated by the influence of recent boisterous weather. Records have been taken during the past year of the maximum wind pressures indicated by two instruments, one connected to a single Dines tube 50 ft. from the ground, and the other to two similar tubes at the same height, but 40 ft. apart, and connected in parallel. The mean results obtained show quite clearly that the maximum intensity of the wind in any gale very seldom reaches the same intensity at two points 40 ft. apart. The mean of fifty observations gave a value of the pressure in the single tube about 11 per cent. greater than that registered by the tubes in parallel, while the pressure in the latter showed an average difference of 22 per cent. Similar experiments are now in progress with tubes on two 60-ft. towers recently constructed for aeronautical purposes, the tubes in parallel being 350 ft. apart.

The resistance of materials to alternating stresses of high frequency has formed the subject of numerous tests, the number of reversals being 2,200 per minute A special machine on the Wöhler method has been provided for fatigue tests of mild steel, and it is hoped that the investigation in hand will be completed during this year. Work continued in 1909 with regard to the elastic limit of material under alternating stress showed that a change always followed an extension of the specimen, and that for any arbitrarily chosen value of the lower limit of elasticity a definite value of the upper limit could always be found. This investigation is specially interesting as affording the first experimental evidence in support of Bausclunger's theory of fatigue. It proved that fatigue is capable of producing slow yielding, whenever the compressive and tensile stresses are unequal, although the maximum stress may be considerably below that at the actual yield point. This suggested that yielding might possibly occur without fatigue, that is, when the range of stress imposed was unable to cause fracture, but all attempts to produce yielding under these conditions failed, and even when started by fatigue the yielding gradually ceased when the range was reduced to a safe value, the maximum stress remaining unaltered. Hence, from the standpoint of the designer it is only necessary to know that the range of stress adopted must be less than the safe range calculated from experiments on the material to be employed, and that the first application of the maximum stress shall not cause appreciable extension.

Early last year a research was commenced at the suggestion of Sir John Wolfe Barry on the strength of welded joints. Out of ninety specimens of iron and steel, fifty-six were welded, and the remaining bars were retained for the purpose of comparative tests. The results so far available point to the following conclusions: (1) That neither the elastic limit nor the yield point differentiates good from bad joints. (2) That the maximum stress often indicates weakness, the most important evidence of a defective joint is given by the elongation and impact figures. (3) That the material at a welded joint is very often in a dangerously brittle state. (4) That good results can only be obtained by making long welds with considerable surfaces in contact.

One other investigation of much structural value is that into the resistance of materials under static load to sudden shock. No results are at present available, the position being that modifications have only lately been made to the single blow impact testing machine, which will render it available for use with specimens under given static tensile stress.

Finally, we once more draw attention to the great need for additional buildings for various departments of the invaluable work carried on by the National Physical Laboratory. A scheme has been prepared showing how the various wants may best be supplied, the project being of somewhat extensive character, and requiring more money than can be expected immediately unless the Treasury will relax their purse-strings. Following the precedent of 1904-5, when the last extensions were planned, the Executive Committee have considered the wants of the laboratory as a whole and prepared a scheme to which effect can be given as funds permit, instead of proposing piecemeal legislation. The policy is wise and conducive to ultimate economy and efficiency.

The present report and evidences of activity at the Laboratory sufficiently indicate the growing value of the institution, and we hope that the additional funds now required may speedily be forthcoming.

THE ARCHITECTURAL ASSOCIATION:

BRUNELLESCHI AND THE RENAISSANCE.

THE ordinary fortnightly meeting of the Architectural Association was held on Friday last week at No. 18, Tufton-street, Westminster, S.W., Mr. C. Wontner Smith, Vice-President, presiding in the absence of the President, Mr. Henry Tanner.

Mr. A. W. Lloyd, Watford, having been elected as a member and Mr. J. Butters reinstated,

The Chairman read the list of officers and Council nominated by the Council for session 1910-1911, which was printed in our issue for March 12, page 287.

An additional nomination was made for the post of Honorary Librarian, Mr. R. Walker proposing and Mr. H. Brittan seconding the name of Mr. G. Grey Wornum.

The following gentlemen were then appointed as scrutineers, *i.e.*:—Messrs. R. Lowry, G. D. G. Hake, H. B. Elkington, F. T. Bush, A. J. Perrin, and B. F. Matthews.

Mr. Maurice Webb, Hon. Secretary, then made the following announcements:—

The sixth spring visit on April 9 to Westminster Abbey, under the guidance of Professor Lethaby.

The Architectural Association play "Arctia," on Monday and Tuesday, April 18 and 19, at the Court Theatre.

Professor Beresford Pite then read the following paper, entitled "Filippo Brunelleschi and the Renaissance":—

"The period covered by the life of Filippo di Ser Brunelleschi, who was born at Florence in 1377, and died in 1446, seems to claim especially, as do so many similar epochs of a life-span, a pre-eminence in artistic and historic importance.

In England this is the term covered by the rapid recovery of national life after the terror of the black death of 1349, and is evidenced in the vigorous development, bold and inartistic though it was necessarily at first, of the so-called Perpendicular phase of Gothic architecture. Henry VII. chapel here at Westminster belongs to a full century later than the youth of Brunelleschi, and enables us to judge by the measure of a hundred years the handicap of England in the evolution of Renaissance architecture.

The Eastern Roman Empire of Byzantium was still a fact, for Constantinople was not captured by the Turks until seven years after Brunelleschi's death, and the strange and short-lived fancy of reunited mediæval Christendom was enacted beneath Brunelleschi's unfinished dome in the Cathedral of Florence, when, on July 6, 1440, Pope Eugenius IV., with all the Court of Rome, accompanied by the Emperor of the East, John Palæologus, and the chief prelates of the Eastern Church, with all the other bishops and prelates went to S. Maria del Fiore, which had been prepared, in the words of Vespasiano, "as beseemed such an

occasion." The scene is thus described by the late Professor Eliot Norton. "The Pope, cardinals, and bishops of the Western Church took their places on the Gospel side, and on the other was the Emperor of Constantinople with all the Greek bishops and archbishops. The Pope sang a solemn mass. Cardinal Julian and Bessarion, Archbishop of Nicea, read from the pulpit in their respective tongues the act of union, and mutually embraced in the name and in the presence of their applauding brethren," and before the multitude who crowded the vast nave of the cathedral and filled the space beneath its majestic dome. "All the world," says Vespasiano, "had gathered in Florence to witness an act of such dignity."

Neither the parent dome of the Divine Wisdom at Constantinople or that later assertor of the claims of the West, the dome of St. Peter at Rome, have been more nearly the harbour and scene of so historic an achievement as that architectural wonder of Brunelleschi's enshrined on that "solemn day" of July.

But the reunion in the cathedral pulpit was but a pageant, its incompleteness typified, perhaps, by the yet unfinished building work. Ere the lantern had been placed upon the dome Constantinople had been taken by the Turks, the great empire of the East dissipated, and the Greek and Latin churches each suffering from the clay of earthly polities, left to pursue divergent courses; Santa Sophia to become a mosque, and St. Peter's to rear itself rather as a protest against Protestantism than as the shrine of an undivided Christendom. How ephemeral seem the deeper aspects of life when one gazes at the still-vivid illumination of the architect's mind throughout the lines and facts of such monumental tabernacles as Santa Sophia, Sta Maria del Fiore, and St. Peter's.

Spirit of the Cinquecento Era.

Symonds will describe for us better than anyone else the intellectual movement and spirit of the era of Brunelleschi, the Cinquecento literally beginning when, as we have seen, he would be twenty-three years of age, so that his prime came with the full tide of that most delightful and wonderful phase of early Renaissance art which included his rival Ghiberti, 1378-1455, and his attached intimates, Donatello, the incomparable sculptor, 1386-1466, and Luca della Robbia, whose delicious art and technical achievement so fascinates ourselves. To this group we have only to add the names of three contemporary painters to indicate the marvellous galaxy of Florentine artistic power: Fra Angelico, 1387-1455; Masaccio, 1400-1443; and Filippo Lippi, 1400-1469. Symonds says, "Speaking roughly, the half century between 1450-1500 may be termed the culminating point of the Renaissance," and we now quote him at length.

"The Italians of the XIVth century, more precocious than the other European races, were ripe for this emancipation of enslaved intelligence. In the classics they found the food which was required to nourish the new spirit, and a variety of circumstances, among which must be reckoned the pride of a nation boasting of its descent from the Populus Romanus, rendered them apt to fling aside the obstacles that had impeded the free action of the mind through many centuries.

Petrarach not only set his countrymen upon the right method of studying the Latin classics, but he also derived the importance of recovering a knowledge of Greek literature. To this task Boccaccio addressed himself, and he was followed by numerous Italian enthusiasts, who visited Byzantium before its fall as the sacred city of a new revelation. The next step was to collect MSS., to hunt out, copy, and preserve the precious relics of the past. . . . Learning was then no mere pursuit of a special and recluse class. It was fashionable, and it was passionate, pervading all society with the fervour of romance. For a generation, nursed in decadent scholasticism and stereotyped theological formulæ, it was the fountain of renascent youth, beauty, and freedom, the shape in which the Helen of art and poetry appealed to the ravished eyes of mediæval Faustus. It was the resurrection of the mightiest spirits of the past. 'I go,' said Cyriac of Ancona, the indefatigable though uncritical explorer of antiquities—'I go to awake the dead.' This was the enthusiasm, this the vitalising faith, which made the work of scholarship in the XVth century so highly-strung and ardent. . . .

Fortunately for the unimpeded expansion of Italian art, little was brought to light of antique workmanship during the XIVth and XVth centuries. The classical stimulus came to painters, sculptors, and architects chiefly through literature. Therefore there was narrow scope for imitation, and the right spirit of humanism displayed itself in a passionate study of perspective, nature, and the nude. Yet we find in the writings of Ghiberti and Alberti, we notice in the masterpieces of these men and their compeers, Brunelleschi and Donatello, how even in the XVth century the minds of artists were fascinated by what survived of classic grace and science. Gradually, as the race became penetrated with antique thought, the earlier Christian motives of the arts yielded to pagan subjects. Gothic architecture, which had always flourished feebly on an Italian soil, was supplanted by a hybrid Roman style. . . . The perfect plastic art of Italy, the pure art of the Cinquecento, however much imbued with the spirit of the classical revival, takes rank beside the poetry of Ariosto as a free, intelligent product of the Renaissance. That is to say, it is not so much an outcome of studies in antiquity as an exhibition of emancipated modern genius, fired and illuminated by the masterpieces of the past."

Character of Brunelleschi.

It would not be difficult to find material for an architectural biography of unusual interest to modern professional men in the career of Filippo Brunelleschi—competitions, committees, strikes, rivalries, the employment of models, and tactical manœuvres of various kinds would be provided such as insure a sympathetic ear; while force of personal character, versatility in sculpture and mechanics, and many points of contact with other branches of art and science would almost fill up the ideal and make Brunelleschi's story the true modern exemplar of an architectural student.

Brunelleschi has not lacked enthusiastic biographers. Vasari, who wrote in 1550, about 100 years after his death, as far removed as we are from Sir William Chambers, declares that he "was of such exalted genius that we may truly declare him to have been given us by Heaven for the purpose of imparting a new spirit to architecture, which for hundreds of years had been lost. But it pleased Heaven, the earth having been for so many years destitute of any distinguished mind and divine genius, that Filippo Brunelleschi should leave to the world the most noble, vast, and beautiful edifice that had ever been constructed in modern times, or even in those of the ancients."

It may be noted that Michelangelo had only shortly before these words were published succeeded to the appointment of architect to St. Peter's, at Rome, which was not therefore in a position to rival this claim of Vasari for the Duomo at Florence.

The stormy rivalries of Florence during his lifetime point to the existence of strong appreciation of his talent, and we find that Cosimo de' Medici introduced him to Pope Eugenius IV. by an autograph testimonial, which runs as follows:—"I send your Holiness a man of such immense capacity that he would have confidence enough to turn the world back on its axis," a character which Brunelleschi did not abate by giving the Pope the not original Archimedean assurance: "Let your Holiness only give me the point whereon I can fix my lever and I will then show what I can do." Truly, this architect would have succeeded in impressing a modern building committee.

Mons. Müntz (quoted in Blashfield and Hopkins's edition of Vasari) "calls Brunelleschi the Christopher Columbus of modern architecture, and asserts that he created it as a complete entity. A mathematician and engineer to the very centre of his being, the cupola of Florence is quite as much an engineering feat as an architectural performance, he left formulæ for the resolution of all problems, and sinned, if at all, by excess of sobriety and gravity." This reticence in architecture, by the way, is not characteristic of the modern engineering intellect. M. Müntz, "admitting that the Italian architects of the XIIIth and XIVth centuries were not from the special point of view of architecture worthy to untie the shoes of a Brunelleschi, an Alberti, or a Bramante, nevertheless regrets the charming decorative fancies rejected for the three orders," but sums up by saying that "the Italians during the Gothic period had become a people of decorators, and that Brunelleschi made them again a people of architects." In the same work Michelet's opinion, in "Histoire de France," is given of him as one, "who had the soul of Dante and his universal mind, but, ruled and guided by another Beatrice, the divine music of numbers and of visible rhythm. Through her he escaped all other temptations, even that of sculpture, whose virile fascination held him for a time. Perspective, mechanics, and all the varied arts of the engineer guided him along the road which he followed in continuous pursuit of that Urania who imitates upon earth the measure of Heaven and the eternity of the handiwork of God."

The Renaissance Movement.

The brilliant and much-lamented William J. Anderson writes, in the introduction to "The Architecture of the Renaissance in Italy," that that movement "has been claimed as a result of the influence of literature and the study of the ancient manuscripts; but literature, while bolstering its decline and fall, had scarcely more influence on its origin than the writings of Virgil, Horace, Livy, and Ovid had on the architecture of the Augustan age they adorned. Originality has never been displayed to greater degree than by the architects of the Early Italian Renaissance, and considered in relation to the direction of all architectural effort for centuries, the interiors of San Lorenzo, the Badia at Fiesole, and Santo Spirito—all churches of Brunelleschi—are real works of genius. Brunelleschi, seeing the confusion and incoherency of the work of his time, went farther afield for his architectural technique to find it in the ancient principles of building, laying the foundation of a great revival by his masterly use of them, while fully satisfying immediate requirementts. In Brunelleschi's resolution to acquire the Roman principles and to build upon them, we have just a distinctive circumstance unprecedented in the world's history, it may be, but in its audacity quite characteristic of the deeds of the time. In its own way it involved as much uncertainty as the voyage of Columbus, and was indicative of the same inquiring and unsatisfied tendency. But Brunelleschi, too, discovered a hidden world, and in the most brilliant way. His discovery was not fraught with the material consequences of that of the mariner, nor the scientific results of that of the astronomer; yet it has had an incalculable influence upon all forms of art production to this day. First in time, he was not second in intellect, in pertinacity, in achievement; and wherever the forms of art are understood and beloved, the genius of Brunelleschi will not fail of honour and renown."

To this, the view of a modern architect, we will add the testimony of Leon Battista Alberti, a young contemporary of Filippo Brunelleschi. Of all the men of the Renaissance, Alberti is perhaps the most characteristic embodiment of its many-sided romanticism, by consent of his own, as well as of our time, the most extraordinary personality of the Cinquecento period. Man of letters, of arms and art, aristocrat and craftsman, dilettante and antiquarian, the father to all of us of the five orders of architecture. After a family exile of thirty years he returns with the revolution brought about by Cosimo dé Medici in 1434 to his native city, and dedicates his treatise on

Painting two years later to Brunelleschi with these words:—

"I have been accusomed both to wonder and to grieve that so many supreme and divine arts and sciences, which, alike from their works and from their history, we see to have abounded in those most highly-endowed ancients, were now lacking and almost utterly lost. And, indeed, hearing from many that this was the case, I thought that Nature, mistress of all things, now grown old and weary, even as she no longer brought forth giants, in likewise no longer produced geniuses such as those most ample and marvellous spirits which she produced in her youthful and more glorious days. But I, since I have been restored, after long exile in which I, Alberti, have grown old, to this our native land, that surpasseth all others in her adornment, I have recognised in many, but chiefly in thee, Philip, and in our near friend, Donato, the sculptor, and in those others, Nencio (*i.e.*, Ghiberti) and Luca (*i.e.*, della Robbia) and Masaccio, genius capable for every praiseworthy work, not inferior to that of any ancient and famous master in the arts. Who is so unfeeling or so envious that he would not praise Filippo (*i.e.*, Brunelleschi), the architect, beholding here a structure so grand, lifted to the heavens, ample to cover with its shadow the whole Tuscan people, erected without aid of framework or multitude of timbers—a work of art, in truth, if I judge rightly, such as, deemed incredible in these days of ours, was neither conceived nor known by the ancients? But there will be another place for reciting thy praises and the virtue of our Donato, and of the others most dear to me by their ways. Do, then, only persevere in inventing, as thou dost from day to day, things by which thy marvellous genius shall acquire perpetual fame and name, and if, perchance, some leisure shall fall to thee, it will please me shouldest thou look over this little book of mine on Painting, which, inscribed to thee, I have written in the Tuscan tongue."

Street and Mediævalism.

How Time mocks, in its progress, at architectural doctrines professing to be grounded upon ethical principles, and makes merry over this confusing of things that differ, may appear from a passage in the preface to the late Mr. G. E. Street's book on the Gothic architecture of North Italy. It might be dangerous to make the quotation, with such a purpose, lest the delicate and precious growth of earnestness in the breast of the architectural student might fade, were it not that Brunelleschi's achievements and personality provide us with a healthy corrective, and thus tend to clarify our judgment, enabling a well-directed enthusiasm to analyse the facts that unlie architectural fancy, instead of imagining that principles of moral action apply when but little else than the physical law of gravitation works. Mr. Street says:—

"It is impossible not to feel that the great and general interest in art created by a revival of true principles within the last few years is a subject of the greatest congratulation to all true artists. It was therefore with the desire to see how far these first principles were worked out by the architects of the Middle Ages in Italy that I undertook my journey. Let me say, too, at the same time," he continues, "that I started without either the intention or the desire to examine at all carefully the works of the Renaissance architects. I should wish also, I must confess, in all my studies of foreign architecture, to confine myself to those buildings in which there appear to me to be the germs at least of an art true and beautiful in itself, and of service to us in our attempt to improve our own work. It does not appear to me that the works of the Italian Renaissance architects really contain this. I see no reason for doubting that if we wish for a purer school of art we must either entirely forget their works, or remember them so far only as to take warning by their faults and failures."

Brunelleschi's practice will without doubt satisfy Mr. Street's genuine admiration for direct architectural expression, and his zeal for the pointed arch which, in the same book, he says is "not only the most beautiful, but at the same time incomparably the most convenient feature in construction which has ever been, or which, I firmly believe, ever can be invented." It may, with some ease to our feelings under the strain of Mr. Street's personality, be well to reflect that his enthusiasm for mediævalism, and nothing else, was itself an antiquarian revivalism, though appearing as the only solvent of the latest problems of architecture, and that it issued through the hand of its enthusiastic devotee into beautiful and really original detail and decoration.

Further, with some deference, one may allege that the "furore" which Brunelleschi's compeers, whether brethren or employers committees, experienced was the expression of a vigorous personality and a qualification with which more modern architects than himself have been equipped, necessary to the bringing to fruition of great architectural conceptions.

Individualism in Architecture.

Individualism came to architecture with Brunelleschi, remained to us until Mr. Street, and is not apparently yet replaced by co-operative design and workmanship. The works of Brunelleschi may be divided into two fairly distinct groups, and it may appear simple to do so, appraising the value of either to the Renaissance movement as follows:—(1) The completion of the mediæval cathedral of Florence by the addition of an octagonal-pointed vault involving architectural and mechanical problems of great importance; and (2) the revival and employment of architectural features, derived from classical studies, of great refinement and beauty, forming the first clearly-defined phase of a new Italian style, and of great subsequent influence and permanent artistic value.

The first, a special problem completing a mediæval conception in a practical manner, came to its termination, and the second, the origination of a method of architecture with new detail and proportions, developed until it obtained a practically complete hold of the architecture of all civilised peoples. These divisions and estimates may be true, but are so only in part. Either achievement, whether in completing mediævalism or initiating classicism, might have been distinct and independent, but in Brunelleschi's case they fell within the grasp of one man, and were effected by a single course of events.

Mediæval architecture is primarily a system of construction achieving artistic expression by features developed and ornamentation arising out of the direct fulfilment of constructive or decorative purpose. The much bandied and battered phrases about truthful design and true principles of the Gothic revival illustrate, though they parody, the beautified engineering of Gothic building. In the exercise of these predominating constructive principles Brunelleschi excelled by vaulting the great octagon of the mediæval cathedral, the largest ever erected with a pointed arch, and thus brought its Gothic design to a harmonious completion. Renaissance architecture, on the other hand, assumes the Roman garb, whatever construction may underlie the form of the building, by an assumed civilisation putting a classic face upon any Philistine nakedness to mask its native or Gothic rudeness.

Brunelleschi was an enthusiast for this classic spirit also; he loved it, mastered it, employed it, tentatively in the Pazzi Chapel, and, as a revelation of new and wondrous gracefulness in the churches of San Spirito and San Lorenzo, while the Badia at Fiesole, and the Loggia of the Innocenti Hospital show that he knew how to employ these artistic materials naturally in expressive construction. The development of a charming architecture, connecting and enshrining the swift movements of sculpture and decorative painting until the time of Michelangelo a century later, is due to his initiative and school. It is difficult to imagine the trend of Renaissance art in the XVth century apart from the character imparted to it by its architectural features and principles. Difficult because setting aside the work of Brunelleschi, we find no architectural leader sufficiently forceful to do more than gradually adulterate the weak Gothic of North Italy with sculpturesque feeling, as at Pisa and Siena, from local Romanesque sources. It is difficult to speculate upon what might have been in the absence of this genius who crystallised the problem of an age, but one may well doubt if Alberti, a quarter of a century afterwards, could have vaulted the octagon of the Duomo, and may certainly conclude that the long struggle and failure at St. Peter's at Rome, of Bramante and his school evidence the fact that their hope to erect a dome similar to the Pantheon was foredoomed to failure. Michelangelo, himself an enthusiastic Florentine, ultimately reverted both to Brunelleschi's pointed dome form and double arch.

Santa Maria di Fiore.

The problem of the completion of the Church of St. Mary of the Flower, that is, of The Lily, alike the Flower of Florence, and hence her name, and of Mary, was urgent just at that period in the early manhood of Brunelleschi, when, as with you, apparently insoluble enigmas exercise perhaps their greatest fascination over the mind. The new cathedral replaced the old historic Church of the Santa Reparata, which resembled the beautiful San. Miniato, the citizens in 1294 having determined upon its rebuilding. The foundation was laid upon the day of the Nativity of the Virgin, September 8, by the Papal Legate to the honour of God and St. Mary of the Flower, and a tax on public expenditure, a graduated poll tax, a legacy duty, indulgences and pardons were ordained for the purposes of the work.

Arnolfo di Cambio was at this time Architect to the Republic, and to him Florence owes the bulk of her XIVth century monuments. The Palazzo Vecchio and the Bargello, each with a wonderful belfry, the great Church of Santa Croce, and the greater Duomo, were all buildings of his hands. Until Arnolfo's death in 1310 the works had continued in spite of much disturbance of civic peace by calamitous wars, seditions, and fire; the exile of Dante coming within this period.

The diminished revenues of the Commonwealth caused the suspension of works until 1331, and in 1334 Giotto, the painter, was appointed chief master of the work of the cathedral, and overseer of the other constructions of the Republic. He quickly begun the design and erection of the Campanile, but died in two and a half years' time, when the tower was only about one-third of its height.

Taddeo Gaddi, his godson, having worked with Giotto for twenty-four years, was one of those to whom was intrusted the oversight of the works on the Campanile; this Gaddi is the celebrated painter, but he also was the architect of that Ponte Vecchio, with its charming street of shops, which has formed the fabric of Mr. Collcutt's pretty dream that London may some day also have a covered bridge across the Thames.

At the Church of S. Maria Novella, in the Chapter House, which became in 1567 the Chapel of the Spanish colony, and therefore is now called the Spanish chapel, Taddeo Gaddi, in conjunction with Simone Memmi, executed one of the most complete and beautiful series of frescoes of the XIVth century.

There are few items so wholly illustrative of mediæval beauty and feeling as some of these decorated chapels at Florence, and one does not wonder at the enthusiasm either of the critics or at the raptures of Ruskin in discussing them. Upon a wall of this chapel the visible church is typified by the Duomo of Florence, which has its proper nave of four bays but with flying buttresses, and an octagon crowned by a cupola of very similar pointed form to the present one surrounded by the semidomes of the transepts and eastern tribune. But it is important to observe in this carefully drawn representation, in which we find early perspective nervously making itself evident, the fundamental

variations from the present cathedral. Some of these are the existence of flying buttresses, as well as the extending raking buttresses to the transept apses, also the treatment of the square angles of the octagon, but chiefly the absence of the great upper story of the octagon, corresponding to the drum of a dome, with its eight eyes. Some difference will be noted in the setting out of the vaulted apses to the transepts, the apices of which are built in front of the walls, but we observe that a lantern is added to the dome. The whole forms an unmistakable representation of the Duomo, about half a century before Brunelleschi erected his dome, which, apparently so long before, was decided upon and accepted both in its general lines and defined intentions.

Professor Charles Eliot Norton has pointed out that after the calamity of the plague of 1348, in which Boccaccio declares that more than 100,000 died within the walls of Florence, one of the natural consequences was a sudden outbreak of pious superstition. Numerous sums had been given and bequeathed by dying men to the Church, so that when order was restored to the community the Church found itself richer than ever before. To quote Professor Norton:—

"Old things had passed away; old designs appeared unsuited to the new conditions. To such a spirit the Duomo, begun sixty years before, in days of comparative weakness, seemed hardly to correspond with the demands of the more lavish and luxurious age. Florence was more pre-eminent than ever among the cities of Tuscany, and her Duomo ought to be representative of her present power and wealth. Accordingly, and doubtless after much deliberation, it was resolved, 'out of regard to the magnificence of the commune and the riches and fame of the city and the citizens,' to adopt a new design for the Duomo on a grander scale than that of the building planned by Arnolfo. The breadth was to remain the same, perhaps in order to preserve the beautiful side walls already constructed; but the walls were to be raised about 21 ft., the length was to be increased by more than a third, and the central area and the eastern end of the church were to be vastly enlarged. This change of design required not only the destruction of the work already done within the walls, but also the strengthening of the foundations, and a doubling of the façade wall."

Professor Norton adds:—

"This reconstruction of the Duomo has been generally overlooked by the historians," and "it appears that only a general scheme of the reconstruction was adopted, leaving the consideration of details until the time when, in the progress of the work, a decision in regard to them might become necessary Probably all that remains of Arnolfo's building are the foundations and part of the interior brickwork of the façade, and the side walls for about 175 ft. eastward from the front."

Francesco Talenti was appointed architect, having succeeded the celebrated Andrea Pisano, and in 1357 the digging for the foundation of the new piers was begun.

Santa Maria Compared with Mediæval Churches.

Ruskin has fallen upon the vast scale of the interior with zest in his "Mornings in Florence"; the contrast to the scheme of the conventual and collegiate cathedrals of France and England which employ a developed multiplicity of parts to give measure to the eye is very marked, but the difference might almost be described as that of one mind to many. The simplicity and homogeneity of the design of the plan, the apparent thinness of the side walls being that of the pre-existent design, is attractive and architectural. I would venture to urge that to a mind prepared to admit all the charms of the nave of Westminster, with its lofty proportions and narrow vistas, it should not necessarily be impossible, difficult, or provocative of that eloquent vituperation customary to the last generation of enthusiasts, to accept and value the purpose and dignity of this great provision of width, spaciousness, and reduction of pillar area evident in the huge municipal nave of Florence. This spaciousness is Italian, the vast cool enclosure in the hot sunny climate is a phase of ecclesiastical design required by circumstances, and is here achieved with constructive skill and common sense not inferior to any traditional development of mediæval buildings in northern circumstances with different materials. The rubble core and ashlar facings of the north make greater demands upon the floor space than the slender brick piers of the south, and in a just comparison it is not so evident that the nave of Florence deserves Mr. Ruskin's narrow but bitter judgment that "the most studious ingenuity could not produce a design for the interior of a building which should more completely hide its extent and throw away every common advantage of its magnitude, than this of the Duomo of Florence."

It would be tedious if interesting to digress upon the variations in mediæval building north and south of the Alps, and tempting to enter upon the uncertain influence here of the building guilds of Northern Italy, though each digression has a bearing upon our subject. It will be impossible however to appreciate Brunelleschi's task unless it is borne in mind that the progressive development of mediæval cathedral building is regulated and marked by the construction of vaulting. The fact that it was necessary to vault the nave occasioned the whole series of factors of aisles, and buttresses, and conditioned the plan of transepts and eastern extension. The use of the pointed arch had enabled vaulting chambers of all shapes and sizes to be constructed with facility in diverse materials by the employment of ribs which gradually assumed to themselves nearly all the constructive qualities. This rib principle left the spaces between without strains or stresses, so that they were filled in with the lightest material, or even left in an open veil of tracery, as in Henry VIIth chapel. In Italy the use of brickwork for vaulting enabled the fillings to be extended, but it never became the practice there, as here, to multiply the strengthening ribs for the sake either of stiffening the vault or for æsthetic reasons. The earlier and later mediæval vaults of Italy, alike, were quadripartite in system, and, as at Florence, of the greatest size, the nave having a width of 55 ft., and consisting of only four immense square bays. The nave of Westminster Abbey having a clear width of 35 ft., employs twelve bays in a similar length of 240 ft.

The principle of both is, however, the same; the rectangular chambers of the vault at Florence are spanned by pointed arches, having stone ribs at the intersections and brick cells between.

The boldness with which the principle of stone groin-ribs with brick filling had been employed in the vast span of the nave seems to have convinced the builders that no greater difficulty would attend the vaulting of the octagon. It may be remarked here that the use of tie-rods to the vaulting and arcades of the nave is an economy designed to dispense with flying and other buttresses, and that where the octagon was placed, and masses of wall occur which provide abutment for the great arches, neither protruding buttresses or tie-rods are employed.

The enormous scale of the octagon, 135 ft. across, with the choir stalls grouped in the centre, was to provide the city with the grandest temple then in Western Christendom, and if the cupola shown in the fresco of the Spanish chapel only supposed upon the basis of Talenti's octagon, but little diminution of its external glory and none of its internal beauty or usefulness would have been sacrificed.

The greater work began in 1357, was pushed on, and ten years later the four bays of the nave were nearly completed. Many consultations with the Board of Works ensued, and difficulties soon became apparent. In 1368 work was begun on the eastern apse, and in 1369 Talenti was succeeded by his son, Municipal funds being required for other objects, among the erection of the Loggia del Lanzi from Orcagna's design, it is not till 1382 that activity at the Cathedral is again evident, for in 1383 the building of the chapels to the choir was commenced and commissions distributed for sculpture. In 1407, after nearly forty years, the eastern tribune, with its five chapels, was completed, and at the threshold of the Cinquecento the construction of the octagonal vault could no longer be deferred.

I have little doubt that it was believed that the vault of the ancient octagon baptistery of St. John, opposite the west front of the Duomo, and so well beloved of all Florentines, afforded all the precedent requisite for that of the Duomo, though approaching double its span. The baptistery vault consists of a plain-pointed brick arch springing from each side of the octagon without ribs and very closely represented by that of the completed Duomo. It was not a dome; the art of building domes, we might assert, was, if not unknown, certainly not practised in mediæval buildings even when circular, and therefore lending themselves to domical treatment as in the case of the baptistery at Pisa, these buildings were simply groined with pointed vaults; but in Florence both the prototype at the baptistery and the greater example at the cathedral are polygons, *i.e.*, octagonal.

Domical Construction and Plan.

It would be a longer digression to consider the relation of domical construction to the planning of Christian churches. The Pantheon at Rome presents no difficulty, the plan being a circle and the dome a hemisphere. By the time Santa Sophia at Constantinople was erected the method of poising a circular dome above a square plan upon piers, by means of pendentives, had been attained, and Anthemius of Tralles had earnt the compliment for Justinian of suspending his dome from Heaven by a chain.

St. Mark's at Venice is an Italian instance of a Constantinople method, and its group of five domes are entirely pre-Gothic, each being supported on four pendentives. A true dome is a vault which is arcuate on plan as well as in section, horizontally as well as vertically, having the strains equally distributed throughout its hemisphere, without constructive ribs, and therefore without the distinction that exists in Gothic vaulting between the rib and the web. The true dome is, theoretically, as homogeneous as an inverted earthenware basin, and the Gothic vault is as distinct in its texture as an opened umbrella with its armature of ribs and flimsy filling.

The four centuries that lay between St. Mark's, Venice, and the octagon at Florence obscured most singularly from the vision of the hide-bound guildsmen the attractive power of the dome as a constructive method. Known but unknown, not scorned maybe, for they decorated them with the Oriental quaint cupolas of the XIVth century which give character to the Piazza of St. Mark, but ineffective and buried as far from their building practice as radium.

Another aspect of domical vaulting, however, was not quite foreign to the mediæval builders of Florence. The fresco in the Spanish chapel depicts an octagonal cupola crowning the cathedral with a domical form having external dignity and beauty, forming a feature by which the building would be recognised as domical, and entering into the perspective and landscape with a graceful curved outline that is the proper complement of the apsidal tribunes around its base.

This external domed outline was practically new to mediæval building, the internal cupolas and lanthorns of Italian churches being covered with roofs and concealed behind screens of arcades and collonades. Yet neither the fresco of the Spanish chapel or the dome erected by Brunelleschi quite

convince us that the external aspect of the dome had æsthetic influence or value to that generation. It was not until a later period in Bramante's career that there is clear evidence of appreciation of the usefulness of the dome to external effect.

But a generalisation citing the Pantheon at Rome first as accomplishing the successful employment of the dome as a vault, Sta Sophia at Constantinople as achieving its support upon pendentives high above the free area of the floor, Florence as sustaining the lantern necessary to crown its external aspect, and then St. Peter's at Rome and St. Paul's at London, as developing alike both the external and the internal values of the dome, is useful, interesting, and relatively sound. The doubtful point is whether Brunelleschi and his contemporaries at all desired to emphasise the dome as such externally, and whether it was a motive in the design or not. I would suggest from the standpoint at which he and they stood, still in the Middle Ages, that external composition as such was not present to their minds. The harmonious lines and geometrical masses of the plan related to the vault system, and the elevation of these masses was determined statically through the exigencies of the vaults, so that constructive and not æsthetic reasoning lead to the extrusion of the great mass of the octagon vault in its really magnificent constructive form.

Sculptor's Work.

The competition of sculptors inaugurated in 1401 for completing the series of bronze doors to the baptistery marks an epoch in the development of the arts of sculpture and bronze-founding. The competitors were selected, and young men are found among the six; Filippo Brunelleschi was but twenty-four and Lorenzo Ghiberti, whose panel was accepted, was twenty. The great reputation of these two young men in their own community may be safely assumed, and each more than justified this early promise by strenuous work in later life. It is stated by a biographer of Brunelleschi that the commission of assessors proposed to divide the commission, and he gives Brunelleschi the credit of declining the work under the circumstances; but in any case the work was given to Ghiberti towards the end of 1403. Vasari's story of Brunelleschi's journey to Rome accompanied by his attached friend, and junior by nine years, Donatello, seems to require further proof, as Professor Norton notes that Donatello appears as assistant to Ghiberti both in his first and in a further agreement for the execution of the gates. It is clear, however, that Brunelleschi, who was of good family, sold some property, and with the proceeds paid the expenses of his visit to Rome, the first of many—and it appears that he worked at his handicraft as a goldsmith, and exercised his mechanical genius at making clocks, maintaining himself thus, but not without visits home again from time to time.

The Influence of Rome.

The condition of Rome after practically a millennium of decadence cannot easily be realised. The great city had been for centuries in a repellent condition of decaying splendour. The Imperial monuments had not yet attained the credit and charm of picturesque ruin under which Piranesi knew them, and were nothing more than the dilapidated symbols of a departed glory. The exile of the Popes during three-quarters of the XIVth century, the rival Popedoms (the Council of Constance which settled them was held in 1414), the factions and troubles crystalising in Rienzi had all tended to divert from Rome any tendency to regard it as an emporium of monumental art. The fame of pagan and persecuting Rome was still obnoxious in its monuments, and the scenes of martyrdom had not yet become sanctified by artistic as well as religious tradition.

As we have already seen, the treasures of classic literature were gradually being revealed, mainly through more cordial relationships with Constantinople at the end of the XIVth century, but the morning of the glory of the architecture and arts either of Greece or Rome was unknown when Brunelleschi visited Rome, an eager artistic Florentine, probably disappointed at the clouding of his hoped-for pre-eminence in his art of sculpture by Ghiberti, though still strongly possessed with a zealous patriotism and fully conscious of the steps taken for completing the greatest cathedral of Italy.

It is not difficult for us to realise what Rome could reveal to such an intelligent artist. Just breathing emancipation from tradition, and conscious that Ghiberti had struck a freer and fresher note in sculpture than any before. The strong genius of his young admirer and follower, Donatello, tended in the same direction, and we are told pretty stories of how Donatello "had eyes only for sculpture"—the great antiques were not then unearthed—while Brunelleschi devoted himself to the monuments. Vasari writes—and how sympathetic every travelling student must feel as he reads!—that "he took no time either to eat or sleep, but every thought was of architecture which was then extinct; I mean," he says, "the good old manner, and not the Gothic and barbarous one, which has much practised at that period." Vasari imaginatively describes his interest in the Duomo at Florence:—

> "He never rested while in Rome until he had well pondered on all the difficulties involved in the vaulting of the Ritonda (the Pantheon) in that city, and had maturely considered the means by which it might be effected. He also well examined and made careful drawings of all the vaults and arches of antiquity; to these he devoted perpetual study, and if by chance the artists found fragments of capitals, columns, cornices, or basements of buildings buried in the earth, they set labourers to work and caused them to be dug out."

Vasari imputes immense activity to him, and probably confuses the studies spread over many visits at different periods of his life. He adds:—

> "Nor did he rest until he had drawn every description of construction, temples round, square, and octagon; basilicas, aqueducts, baths, arches, the colosseum, amphitheatres, and every church built of bricks, of which he examined all the modes of binding and clamping, as well as the turning of the vaults and the arches."

Brunelleschi appears to have been again in Florence three years after the competition for the Bronze Gates in 1404, as he matriculated as a goldsmith on July 2 in that year; the celebrated guild, which included modellers, workers in metal, and painters. To obtain civil rights it was necessary for all Florentines to belong to one of the guilds of art, which were represented in the civic government by twenty-four Consuls. The Signoria or members of the chief government acted in conjunction with the Consoli in initiating such works as the Baptistery Gates. The patrons of the Cathedral works were the clothworkers, and it appears that in November, 1404, the Board of the Works appointed a Commission of four Consuls of the clothworkers, and nineteen special Commissioners selected from the goldsmiths' and masons' and carpenters' guilds; among the goldsmiths we find Ghiberti and Brunelleschi; the reference to the Commission was the cornice to the external walls. An interesting example of these Gothic bracketed parapets can be observed on the Loggia del Lanzi; that to the Cathedral was built in the accepted manner, and no impress of classic idea seems yet apparent as an evidence of Brunelleschi's Roman studies. On February 16, 1405, the Commission dissolved. The building works at the Cathedral proceeded slowly, and in 1407 the eastern tribune was finished, and those to the transepts were well forward.

It is probable that Brunelleschi spent the ensuing years, until he was forty, at Rome, a reputation for knowledge of architecture, however, accruing to him at home during the period of his absence from Florence. He must not be regarded as a disappointed sculptor, who exiled himself from his own field of executive art through jealousy of an accomplished rival, but as having discovered a new source of inspiration and study in that combination of mechanics, geometry and art afforded by the buildings of Ancient Rome from which he could not tear himself away. We do not find him again in Florence until 1417, ten years after the Commission about the cornice, when the Board voted him ten golden florins for drawings and work connected with the cupola. By this time the walls of the octagon had been raised above the surrounding roofs by an additional stage which provided a great clearstory, and the eight round windows or eyes were in progress.

The Building of the Florence Dome.

It is not easy to understand how this stage can have been reached without the adoption of some well-defined scheme for the vaulting, as the elevation above the abutting walls removed it beyond the possibility of employing them as buttresses. The provision of this drum story lifted the cupola vault from the category of Gothic vaults, and at once placed it among the long-forgotten and forsaken series of domes originating with the Pantheon at Rome, and developing in the later epoch of Byzantine architecture. A dome poised upon a drum has to provide for its own thrusts, which should be reduced to a minimum by horizontal arcuate construction, and can then be counterpoised by weight placed vertically upon the haunch as in the *gradene* of the Pantheon. The Gothic pointed vault, however, could not exist even momentarily without the ample lateral abutment of flying buttresses or massive walling; and it has already been pointed out how iron tie rods provided for this in the vaulting of the nave. I must confess to the strongest suspicion, though there does not appear to be direct evidence to support it, that the elevation of the cupola is due to Brunelleschi's advice, and that his observations at the Pantheon convinced him that what had been done by the ancient Romans was not beyond his powers. It is certainly highly probable that this height would not have been erected without reliance upon some guide or scheme for dealing with the thrusts of the vault. In any case, embarrassment attended upon the Board; the Guild of Master-masons seem to have exhausted their traditions, and the actual need for an impossibly big centring upon which to build the vault, after the manner of the baptistery, though so much larger, brought the works to a standstill.

The variation from the Spanish Chapel fresco raises the whole question of the use of working drawings; it would appear that designs existed, of which the fresco of the completed Duomo is evidence, and yet the deadlock and absence of prevision would indicate that drawings of any practical value did not exist, as they would have obviated progress to the point up to the edge of the impossible.

An anonymous contemporary of Brunelleschi's, whose work is the probable basis of Vasari's as well as of other biographers, tells us, "But if the master builders had seen difficulties, Philip showed them far more. And someone asking, Is there, then, no mode of erecting it? Philip, who was ingenious also in discourse, replied that if the thing was really impossible, it could not be done; but that if it were not so, there ought to be someone in the world who could do the work." The recorded payment of ten florins was not probably made only for this philosophic stimulant, but for advice and work in connexion with the whole drum story and its eight suspiciously Roman eyes.

Between this year (1417) and 1420, when Brunelleschi, Ghiberti, and Battista d'Antonio, master mason, were jointly appointed to build the cupola at a salary

of three florins a month each, there was much evident controversy, and there is in the anonymous biography and in Vasari much picturesque description of indecision on the part of the Committee, rivalry on the part of the "profession," and strategetical manœuvres between Rome and Florence by Brunelleschi. Amidst it all, the fact ultimately emerged that the professed sculptor-goldsmith, but amateur builder, had science and skill enough to make him confident of his ability to design scaffolds and construct a vault upon the huge octagon, 135 ft. across, that would stand either without abutment or cross-ties. The three years' discussion and disputation amounted to a conviction that the little, clear-headed man of forty-three could do it, and his mystifications and secretiveness, his sudden absences, and vigorous assertiveness were the means by which this conviction was produced.

The joint appointment of the popular artist Ghiberti, with his strong local interests (Florence had become enthusiastic over his bronze doors), and of the recognised professional man, Battista, seems, under the circumstances, reasonable, though the difficulties of joint control were little compared with those of joint reputation which were ultimately involved. This latter point was everything to such a character as Brunelleschi's, and led to the squabbles with Ghiberti, and to the ultimate demonstration that Brunelleschi could and would carry the works to successful completion alone.

A competition was inaugurated on August 19, 1418, for the designs for the cupola, and a premium of 200 florins offered, the time extending to December 12. In the next year Brunelleschi and Ghiberti each were commissioned to make models on a large scale, and Brunelleschi employed Donatello to assist him with Nanni di Banchi. A brick model was made, based on his Roman studies, exhibiting the apparently impossible feat of how to build a dome without centring, an achievement derived from the Pantheon, and embodying the fundamental difference between a dome erected in horizontal rings or series, each complete and supported on its predecessor, and the mediæval groined rib to which, from the springing, a wooden centring piece was necessary.

The Board of Consuls appointed four additional citizens as assessors to assist them in deciding, and spent some months in anxious deliberation upon the models. Brunelleschi presented a report which has been preserved in the pages of his biographer and Vasari. The latter depicts the author as previously discussing with the Committee in such growing heat at their inability to understand him that they ordered him to leave the room, which, he refusing to do, was removed, *à la suffragette*, though, ultimately, however, as we have seen, he was appointed with two colleagues.

Brunelleschi's Report.

The Report is of sufficient clearness to guide us to an understanding of his scheme, and may be cited at some length.

"The difficulties of this erection being well considered, magnificent signors and wardens, I find that it cannot by any means be constructed in a perfect circle, since the extent of the upper part, where the lantern has to be placed, would be so vast that when a weight was laid thereon it would soon give way. . . . I have, therefore, determined to turn the inner part of this vault in angles according to the form of the walls, adopting the proportions and manner of the pointed arch, this being a form which displays a rapid tendency to ascend, and when loaded with the lantern each part will help to give stability to the other. The thickness of the vault at the base must be three braccia and three-quarters; it must then rise in the form of a pyramid, decreasing from without up to the point where it closes and where the lantern has to be placed, and at this junction the thickness must be one braccia and a quarter.

A second vault should then be constructed outside the first to preserve the latter from the rain, and this must be two braccia and a half thick at the base, also diminishing proportionally in the form of a pyramid in such a manner that the parts shall have their junction at the commencement of the lantern, as did the other, and at the highest point it must have two-thirds of the thickness of the base. There must be a buttress at each angle, which will be eight in all, and between the angles in the face of each wall, there shall be two, sixteen in all; and these sixteen buttresses on the inner and outer side of each wall must each have the breadth of four braccia at the base. These two vaults, built in the form of a pyramid, shall rise together in equal proportion to the height of the round window closed by the lantern. There will thus be constructed twenty-four buttresses, with the said vaults built around, and six strong and high arches of hard stone, well clamped and bound with iron fastenings, which must be covered with tin, and over these stones shall be cramping-irons, by which the vaults shall be bound to the buttresses. The masonry must be solid, and must leave no vacant space up to the height of five braccia and a quarter; the buttresses being then continued, the arches will be separated. The first and second courses from the base must be strengthened everywhere by long plates of hard stone laid crosswise, in such sort that both vaults of the cupola shall rest on these stones. Throughout the whole height, at every ninth braccia, there shall be small arches constructed in the vaults between the buttresses, with strong cramps of oak, whereby the buttresses by which the inner vault is supported will be bound and strengthened; these fastenings of oak shall then be covered with plates of iron, on account of the staircases. The buttresses are all to be built of hard stone, and the walls of the cupola are, in like manner, to be all of solid stone bound to the buttresses to the height of twenty-four braccia, and thence upward they shall be constructed of bricks, or of spongite, using the lightest. Eight ribs of marble shall be formed at the angles of the external surface of the cupola of such thickness as shall be requisite; these shall rise to the height of one braccia above the cupola with cornices. Thus the cupola shall be constructed after such manner as shall be determined by the masters who may have to build it, since practice teaches us by what methods to proceed."

This remarkable document shows actually the parting of the ways between rib-vaulting and domical construction, the horizontal linking together of the buttress ribs with lateral arches, the provision of double vaults, and the clear perception of the effect of putting weight upon a semicircular vault, all evidence an intelligent discerning analysis of the Roman examples.

Another address by Brunelleschi runs as follows:—"Doubtless great things are always difficult to accomplish, and if ever anything was difficult, this affair of yours is more difficult than you perchance are aware, for I do not know that even the ancients ever vaulted a vault so terrible as this will be. And I, who have often thought on the armatures required within and without, and what means could be invented so that men could work on it with safety, have never succeeded in solving the difficulty, and I am dismayed not less by the breadth than by the height of the building. If, indeed, it could be covered by a spherical dome, the mode might be adopted which the Romans employed in constructing the dome of the Pantheon, but here we must adopt an eight-sided design with such joints and bindings of masonry as will be most difficult to execute."

The design included a great bond of timber near the base, bound with iron ties, to encircle the dome and collect any outward thrusts; this was completed in August, 1423. The position, intention, and design of this tie is interesting in connexion with the Italian practice of relying upon ties to their Gothic arches; this bond timber has answered its purpose fully, and realising that the whole stability and success of the vault consisted in maintaining a horizontal system by means of the connecting arches between the buttresses, we regard this timber bond as an additional precaution illustrating the same principle.

We cannot stay to dwell upon the interesting story of Brunelleschi's relationships with the Guild properly charged with building, who actually once locked him up for being a blackleg, or his professional difficulties with Ghiberti, whose appointment resulted in nothing but unpleasantness. Brunelleschi's mechanical and organising genius found ample scope in the design of flying scaffolds and screens, after that the vault had risen to a point where it became dangerous to the workmen, but consistent perseverence with the system of horizontal binding by arches, the wooden bond, and series of stone cross-ties between the two vaults succeeded, so that at length on June 12, 1434, the cupola closed over the central space. In the words of Professor Norton, "It had grown slowly, marvellously, in the eyes of all beholders, who saw its walls rise, curving over the void without apparent support, held suspended in the air as if by miracle. Brunelleschi's fame was secure, henceforth his work was chief part of Florence."

Pope Eugenius IV. fled from Rome to Florence in 1434, where he was welcomed, and with great pomp consecrated the church on Lady Day, bestowing the Golden Rose upon St. Mary of the Flower. The work on the cupola was not completed until 1436, when on August 30 the Bishop of Fiesole mounted the dome to bless it. The lantern still remained to be its crown. For this Brunelleschi had made a model, but the co-operative idea was so strong that other designs were invited and considered, among them one by an adventurous but aristocratic lady, whose appearance in such an undertaking seems to have excited the contempt of Vasari, who says that even "a woman of the house of Gaddi ventured into the competition." It will be remembered that Taddeo Gaddi was appointed architect a century earlier to complete Giotto's campanile, and was the painter with Memmi of the Spanish Chapel.

Meetings and discussions ensued, and on December 31, 1436, the Board unanimously decided "that the said lantern should be constructed and built according to the model of Philip Master Brunelleschi, and that the ordering and execution of the work should be committed to Philip."

The procuring of marbles for this work and some years of delay ensued, together with war, plague, and contentions. The funds fell off, Brunelleschi's salary was reduced one-half; for three years there is no record of work. In 1445 it was resolved that "Philip, who said that he could do the work," be appointed "sole overseer for the term of his life"; with the extraordinary qualification but "no longer," at a salary of 100 florins annually.

Brunelleschi was now 69, and died on April 16, 1446, without seeing the completion of the lantern; there was genuine and wide sorrow at his death; his body was laid within the Duomo, and it was ordered that the marble slab upon it should be inscribed "Filippus Architector."

This paper has now for a considerable time trespassed upon the moments of the night, and apology is needed for its want of compression.

Other Work of Brunelleschi's.

Brunelleschi's life-work was not, however, confined to or limited by the completion of the Duomo; in 1420, the year of the model of the cupola, he begun the erection of the Mortuary Chapel for the Pazzi family in the cloister of Santa Croce, a small rectangular apartment covered by a most interesting convoluted dome supported upon pendentives; this work exhibits with fulness the charm of Brunelleschi's power as a draughtsman and designer, the elegance, refinement, and originality of the whole are wonderfully fascinating and characteristic. The original vigour of the vaulted atrium, with its delicately-moulded attic story and beauteous frieze. The delicacy of the doorway and the entire freshness and grace of the relief and treatment make this work a gem of Renaissance, as it indeed is its first full architectural flower. A work such as this exercised a powerful influence in Florence as justifying

Brunelleschi's confidence in himself, though no part of his work at the Duomo offered the artistic scope of this little building. His intimates, Donatello and Luca della Robbia, assisted in the frieze and internal roundels and plaques.

The beautiful series of drawings by Mr. A. R. H. Jackson published a few years in the Architectural Association Sketch Book, illustrate this building most fully. It may be remarked that the dome has no external expression.

In 1421 he designed the portico to the Foundling Hospital, which has the celebrated bambinos of della Robbia, a work characterised by the same delight in graceful proportions and refined mouldings, qualities which, it may be noted, were not derived first hand from Classic precedent, but infused by his own genius.

In 1426 the foundation of the great church of San Lorenzo was laid; in the simplicity of this plan and the great success of the order and arcade, the same quality of refined grace is working upon a basis, well laid, of early basilican planning. The late Roman tradition is laid aside, and the architectural value of the order demonstrated without pedantry or antiquarianism.

The sacristy, the older one, of San Lorenzo, the Medeci Chapel, with the monuments by Michelangelo being called the New Sacristy, is also one of the most remarkable and successful buildings of Florence. The dome is employed upon properly-developed pendentives over the square apartment, and again over the altar recess. The fresh originality and freedom is very interesting, the architect evidently feeling his way to originality in dealing with his problem, reflecting with ease and pleasure the fruits of his classic studies.

The Church of San Spirito was begun in 1428, and follows San Lorenzo very closely both in plan and effect; these make a remarkable pair of churches, like sisters resembling each other with a charming family grace and elegance.

No work of Brunelleschi's after the Pazzi Chapel has such a direct appeal to an eye jaded with the later richness of the Renaissance as the Badia at Fiesole, illustrated and described with enthusiasm by Mr. Anderson. It illustrates remarkably that the discovery of the inexhaustible store of Classic ornament, and of its luxurious use, had not in any way corrupted a strict and almost Puritan taste in the employment of decorative features, the cloister, the chapel, and the refectory are simply delicious in their delicacy, and in the complete value accorded to each ornamental feature and element. The proportions are not guided by any convention, and are fresh and natural to the building. The carving evidences the fastidiousness of a goldsmith in dealing with a rare opportunity in a precious metal.

The civil buildings that fell to Brunelleschi are neither few nor unimportant. His reputation brought him private patrons, for whom he designed the immense Pitti palace; the setting out of the immense façade to the Piazza is his, though the front to the Boboli Gardens is alter and by Ammanati. The Pazzi family palace is another example of this class. Both are characterised by breadth, simplicity, and strength. Originality is avoided, the Tuscan type being adopted with small refinements throughout, but a larger breadth is always maintained.

These buildings laid or preserved the lines upon which the Florentine palaces afterwards developed, Brunelleschi's great pupil Michelozzo continuing his tradition with power in the great Riccardi palace for the Medici family.

The whole pathway of Renaissance architecture was now prepared, lines of progress and discovery made possible, and precedent provided. The onward march of the movement is from Brunelleschi to Michelangelo, through a century of wonder as we look back through the mists of ages and reconnect it with the work of painters, sculptors, and craftsmen. What the movement owes to Brunelleschi it is not easy to estimate; the debt is at once so great and so involved with the completion of mediævalism.

Renaissance architecture did not come to Florence, as to France, England, and the rest of Europe, by emulation and report of already achieved wonders, but it was created, though recreated, in a sense, by Brunelleschi's enthusiastic studies, force of personal character, and marvellously refined architectural discernment. Whether or not the XIXth century in England in any way reflects the XVth century in Italy is a fancy with which it would be tempting to play, as with a dream which exaggerates extremes of delight and absurdity. Have not we known more Brunelleschis than one among our student enthusiasts? Have we not wrestled with clients' problems and immeasurably bold achievements? And is not England decorated with XIXth century monuments of architectural individuality, triumphant expositions of all the virtues of foreign study and home conquest?

But where is our Duomo? Where has the problem of changing epoch fallen into our hand? For this we wait; it may come yet; so learn patience, perseverance, and professional pride from Brunelleschi."

Mr. Beckwith Spencer, R.C.A., in proposing a vote of thanks to Professor Pite, said that what greatly interested him was the spaciousness of the Italian churches, and he wondered whether there was anything in the fact that Gothic architecture was introduced into Italy with a deliberate purpose. It was introduced by the Franciscans to fulfil the need of preaching. They were popular preachers, and they wanted churches uninterrupted by pillars, in which people could see and hear, and so they imported the new Gothic style from France, and it was perhaps for that reason that the buildings assumed the spaciousness they did. Gothic was never quite at home in Italy, and the architects wavered between the old manner and the Gothic or barbarous manner, as Vasari had it. It was in this period of transition that Brunelleschi lived, and it was his great personality that made him in architecture what Giotto was in painting and Donatello in sculpture.

Mr. Walter Cave seconded the vote of thanks, and said he agreed that Gothic never really took hold in Italy; things turned from the West to the East rarely succeeded. Art came from the East; classical work did; and it gradually worked its way to the limits of Europe. Gothic never reached in Italy the perfection it attained in France and England. One interesting point brought out by the lecturer was that the classical dome was built on Gothic lines. Wren, at St. Paul's, was working out a new principle, and he never bothered about Gothic. Professor Pite seemed to think that Brunelleschi and Ghiberti did not really consider the effect of their work from the outside, but only from the inside, and the construction. Was that really his view?

Mr. H. H. Statham said that ever since reading Vasari's "Life of Brunelleschi" he had felt there was a sort of glamour about the name and doings of the man; he was an exceptional man, who combined immense enthusiasm with a strong practical knowledge and feeling for construction; and it was remarkable to hear of the care he took in putting the requisite ties all round his dome—a thing which Michelangelo, his greater follower, in some respects neglected, for St. Peter's dome nearly failed subsequently for want of similar ties. He rather wondered why Brunelleschi, when he had an octagonal base, did not try making a circular-plan dome, with small pendentives at the angles. It would have been an easier construction, and the problem of building a circular dome without scaffolding would have been safer. He should like to ask Professor Pite whether there was any information as to the way in which one course was put upon another. How did Brunelleschi manage it without scaffolding? The fact of the dome in question being octagonal made the risk greater, as the courses did not form horizontal arches. He had been much impressed in seeing the lantern illustrations of the doorways, and especially the beautiful delicacy and restraint with which the mouldings were handled. The cornices over the doorways had not the projection which was usual in classical cornices; they were flat and delicate, and produced quite a different effect from that got in the usual doorway with classical cornice. He had never been a great admirer of the exterior effect of the Florentine dome; it was wonderful construction, but he had always thought the great beauty of the dome was the spherical line, and that the octagonal dome, however interesting, was not the finest form.

Mr. Alan Potter said they had had two personalities before them that night. Brunelleschi and Professor Pite, and they could learn from one by his work, and from the other by his knowledge and enthusiasm—especially the latter. As to the construction of Brunelleschi's dome, until two years ago the construction of the dome without centering was quite a mystery to him, but about that time a method was suggested by a gentleman now in practice in Florence who inspected the dome, accompanied by a Florentine archæologist, and the suggestion he made appeared to make the construction absolutely practical—*i.e.*, that the inner shell of the dome was the permanent centering of the dome, and that just as a circular dome on plan was built, so to speak, in a double arch and ring, so Brunelleschi constructed the eight sides of his dome on eight flat arches—that was, horizontally. It would create a thrust at the angles, and to counterbalance that thrust the architect placed on top of the shell or buttressing outside of the shell the eight large buttresses, which were really buttresses of the shell and not ribs, as was so often stated. The fact of the connecting arches between the outer ribs also confirmed that, as tending to concentrate the weight on the ribs at the angles, which were a weak point resulting from eight flat arches laid horizontally. As to Brunelleschi's visit to Rome, what struck him about that was that the architect went there with an intention, an ambition—*i.e.*, to dome the cathedral at Florence. The difference between going to study with a definite intention instead of a general intention, was very great indeed. Brunelleschi must have given his time, as Vasari said, chiefly to the study of the construction, and certainly he would have done that if the dome was his ambition. As to the refined detail of the work, they had seen, what, he believed, was the result of mediæval influence rather than Roman study. Brunelleschi's details were details in reality and not features; in so much of the later Renaissance work the details had become features—the details predominated. In Brunelleschi's work one found that the building constructor was uppermost, and the details were secondary. Mediæval influence was also evident in the plan.

Mr. Statham said he should like to ask Mr. Potter if he meant that each face of the dome was a flat arch?

Mr. Potter: Yes, but he did not think it was visibly so.

Mr. H. P. G. Maule said that one lesson to take away was that all great architecture was an architecture of construction, and not of what one might call scenery. The more one studied the history of architecture and the great works of the past, the more one realised that so far as their education as architects went, it must proceed upon lines of architectural construction, and if they lost sight of that they would be failing in their very obvious duty. The lecture brought home to them how vital the constructional problems were to them.

The Chairman, in putting the vote of thanks to the meeting, said that the life of Brunelleschi was more or less bound up in that marvellous piece of construction—*i.e.*, the dome of the church at Florence. As to the idea of Brunelleschi that as the dome was rising, there would be a tendency for the upper part to spread, and that the lantern was necessary to keep it down, it would be interesting to know whether the extra weight at the top would not have tended to force the dome out at the bottom, rather than to keep it down. He did not know why the building of the dome should have made such a stir at the time, for the domes at Rome, St. Sophia at Constantinople, and at Pisa, had, he thought, been previously constructed. Perhaps it was that the Florence dome was the first one that had been constructed with an inner and outer face, and not in one solid piece. The inner dome followed, he supposed, the same lines as the outer dome for the reason that there would be less thrust than if it had been made flatter inside.

The vote of thanks having been heartily agreed to,

Professor Pite, in reply, said there was ample evidence that Brunelleschi had special bricks made for building the dome, and the sizes were mentioned, but he did not think anything was said as to their being wedge-shaped.

Mr. Statham: Was there not something mentioned about a rebate on the top, so that one brick hooked on to the one underneath? Did not Vasari mention something of the kind?

Professor Pite said that might be so, but he did not pay the fullest attention to Vasari because he was so unreliable, although an architect. As to Mr. Potter's point, it did not seem to have anything new in it because the arches sprang from the inner surface and included the outer and not the inner, and one could imagine a series of eight arches with pressure put upon them which distributed the pressure horizontally. As to the possibility of building the dome without centering, Brunelleschi first built a dome of brickwork without centering as a model, and that would show the angle on which the bricks would hold together without falling. The cone of St. Paul's, London, was built of brickwork without centering. The terror of the workmen, however, constantly appeared to Brunelleschi, and after two men had been killed they refused to work until he constructed a screen to prevent them from seeing the ground. He then invented machinery to haul them up and down. As to the external dome, he (the speaker) did not think Brunelleschi cared a rap about external appearance. That was never part of his scheme, and if they looked at his other domes it would be seen that Brunelleschi covered them with roofs. It was not until a later period—Bramante's period—that the domes were exposed. As to the weight of the lantern, Brunelleschi insisted that the more weight put on the pointed arch the firmer the dome would become. As to the weight of the two arches, when Michelangelo designed the dome of St. Peter's he employed different springings—the one for the outer arch being different from the inner; he brought the outer arch on to the base of the inner so that the weight of the one acted as a counterpoise to the weight of the other.

The Chairman announced that the next meeting will be held on April 29, when Mr. Mowbray A. Green will read a paper on "The Architecture of Bath."

The meeting then terminated.

CHURCH HALL, WORCESTER PARK, SURREY.—It is proposed to erect a hall in connexion with St. Philip's Church, Worcester Park. The plans, which have been executed by Mr. A. Thomas, of Worcester Park, provide for a public hall, with seating accommodation for 300 persons, classrooms with movable partitions, a billiard-room, kitchen, and offices. The cost of the hall will be about 2,000*l*.

PYLON, BORSIG BRIDGE, BERLIN.

THE illustration shows the bridge pylon referred to under "Magazines and Reviews" in the Supplement to our issue of March 19, and is reproduced from an engraving in the *Architectural Record* (New York).

The monumental character of the pylon would have been better had the rustication been carried out in the lower as well as in the upper portion of the masonry; it seems rather an anomaly to plant rusticated masonry on the top of smooth ashlar work. But the pylon has the merit of looking like what it is—a structure to carry the chains over, and in this respect it may be usefully compared with the treatment of the similar problem at the Tower Bridge, where the chains are carried through what appears to be an ordinary small house.

Professor Möhring, of Berlin, is the designer of the architectural portion of the bridge.

THE SITE OF THE GLOBE THEATRE, BANKSIDE.

IN our "Note" of November 13 we adverted to the difference of opinion which prevails concerning the site of the XVIIth century playhouse. No one, it seems, has yet cited the conclusive testimony of an eye-witness of the remains of the structure. The Conway MSS. contain a passage in Mrs. Thrale's handwriting, thus:—

"For a long time then—or I thought it such—my fate was bound up with the old Globe Theatre, upon the Bankside, Southwark: the alley it had occupied having been purchased and thrown down by Mr. Thrale to make an opening before the windows of our dwelling-house. When it lay desolate in a black heap of rubbish, my mother one day in a joke called it the Ruins of Palmyra: and after they had laid it down in a grass-plot, Palmyra was the name it went by, I suppose, among the clerks and servants of the brew-house; for when the Quaker Barclay bought the whole I read that name with wonder in the Writings. . . . But there were really curious remains of the old Globe Playhouse, which, though hexagonal in form without, was round within, as circles contain more spaces than other shapes, and Bees make their cells in hexagons only because that figure best admits of junction."

Mrs. Thrale married Henry Thrale in 1763; she finally left her town-house in Deadman's-place—now Park-street, north and south—in, as she says, July, 1781, some months after her husband's death. Authentic maps show there can be no question that Globe-alley, built after the pulling down of the theatre in 1644, stood within the present confines of Barclay & Perkins's brewery. It lay to the south of Maid-lane—now Park-street, east and west—and led westwards out of Deadman's-place, that is, from opposite the Thrales's house. The parish workhouse which Henry Thrale bought in or before 1777 is plotted at the west end of Globe-alley in Rocque's map, 1746; a conveyance, 1732, by Wadsworth to Thrale cites "Globe-alley in antient times leading from Deadman's-place . . . to the then Globe Playhouse."

APPOINTMENT OF SANITARY OFFICER.—The Local Government Board has sanctioned the appointment of Mr. S. Jeffrey as sanitary inspector in the Metropolitan Borough of Islington.

Pylon, Borsig Bridge, Berlin. Professor Bruno Möhring, Architect.
(From the *Architectural Record*.)

MARCH 26, 1910.

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MEETINGS.

WEDNESDAY, MARCH 30.

Carpenters' Hall, London-wall (Free Lectures on Arts Connected with Building).—Mr. F. W. Pomeroy on "Sculpture as Applied to Buildings." 7.30 p.m.

Edinburgh Architectural Association (Associates' Meeting).—Mr. I. B. Stoughton Holborn, M.A. (Oxon), on "The Spirit of Mediæval Art." 8 p.m.

FRIDAY, APRIL 1.

Leicester and Leicestershire Society of Architects (Students' Evening).—"A Sketching Tour in Normandy," by r. B. J. Fletcher; "A Sketching Tour in Brittany," by Mr. S. J. Wearing; "Osmaston Hall, Derby," by Mr. Douglas W. Day. Illustrated by slides, sketches, and measured drawings.

London County Council Central School of Arts and Crafts (Lectures on Historic Arts and Crafts).—Mr. G. H. Palmer on "The Influence of Illustrated Manuscripts on the Type and Decoration of Early Printed Books." 6 p.m.

Glasgow Technical College Architectural Craftsmen's Society.—Business meeting. 8 p.m.

Architectural Societies.

EDINBURGH ARCHITECTURAL ASSOCIATION.

Mr. Thomas Beattie, sculptor, delivered a lecture to the members of this Society on the 16th inst. in the Association's rooms, George street, Edinburgh, entitled "Plaster Decoration: Principally Handwork." Mr. John Watson, F.R.I.B.A., presided. Mr. Beattie said he would deal with modern practice rather than the historical aspect of the subject. Having reviewed the revival of the art in Scotland, he described some of the methods of obtaining the effects of the early work, illustrating his remarks with lantern slides of the materials composing the complete designs. He showed a series of slides of the completed work, chiefly cuttings from Ardkinglass, Briglands, and other recently built mansions. These, he said, proved the beauty and utility of hand-work plaster as a decorative medium, even when the style was early and a trifle archaic. Having referred to the artistic qualities of the material and its possibilities, and having suggested the style of work most suited for plaster, he put on the screen examples of a later and much richer style of work, from Hindley Hall, "The Peel," The Glen, Innerleithen, and other recent works. The Chairman expressed the hope that the lecture would help to create an interest among architects in an interesting art.

ABERDEEN ARCHITECTURAL ASSOCIATION.

At the meeting on Saturday last Mr. Theodore Fyfe gave a lecture on architecture in ancient Crete, the subject being in fact that of the Palace at Knossos. The whole story of the excavations and the discoveries has been given in our columns before, so that it is unnecessary to repeat it now. The lecture was illustrated by a number of slides showing the various portions of the remains discovered.

"DRY ROT" IN TIMBER.

WE have received the following, signed by Mr. Ian MacAlister, Secretary, from the Royal Institute of British Architects:—

"The attention of the Council of the Royal Institute has been drawn to the issue in October, 1909, of a leaflet by the Board of Agriculture and Fisheries referring to the increasing prevalence of the disease known as 'dry rot' in timber used in the erection of buildings, and, having taken the matter into consideration, the Council deem it to be in the interests of the public generally to issue some observations thereon.

From the official leaflet the following extracts are taken:—

'Infection with the dry-rot fungus sometimes takes place in the forest when felled timber remains stored there for some time. The first evidence of such infection is indicated by the presence of red stripes in the sawn wood. If such wood is thoroughly seasoned the mycelium present in the red stripes is killed. If the seasoning be neglected or imperfectly done, the mycelium, which possesses the power of remaining in a latent condition for some time, commences active growth when the wood is used in any part of a building where it is exposed to dampness, and this in some cases is unavoidable, as when the ends of joists are built into a wall.

Under such circumstances dry rot eventually appears.

On the other hand, the fungus is by no means rare on old beams and boards stored in wood-yards, etc., and it is mainly from such sources that spores or portions of the spreading mycelium are introduced into buildings by new wood which has become infected.

The fruit of the dry-rot fungus presents the appearance of irregularly shaped, flattened, or undulating patches of variable size, adhering by their entire under-surface to the substance on which they are growing. When mature the central portion of the patch is covered with an irregular network formed by slightly-raised anastomosing ribs, and is of a rich brown colour due to the enormous quantity of spores which are deposited on surrounding objects under the form of snuff-coloured powder. These spores are diffused by currents of air, or by rats, mice, and insects.

The margin of the fruiting patch is surrounded by a snow-white fringe of mycelium, which spreads in every direction over surrounding objects, creeping up walls, and passing through crevices, the advancing mycelium being supplied with food and moisture from the parent plant growing on wood.

This food is conducted through cord-like strands, which form behind the thin advancing margin of mycelium.

Owing to this supply of food from a central source, the mycelium can extend over stones and other substances not containing food, and thus spread from the basement to the top of a house. Each time the migrating mycelium comes in contact with wood, the latter is attacked, and a new centre of food supply is established, from which strands spread in search of other sources of food. The mycelium often forms felt-like sheets of large size that can readily be removed intact. These sheets are white at first, but soon change to a pale grey colour—a character by which dry rot can be readily distinguished from another wood-destroying fungus, *Polyporus fomentarius*, even in the absence of fruit, the felted mycelium of the latter remaining permanently white.

The specific name of *lacrymans*, or "weeping," alludes to the power of the fungus to attract moisture from the atmosphere. Under certain conditions moisture is absorbed to such an extent that it hangs in drops, or even drips from the surface of the fungus. This moisture assists very materially in rotting the timber, which afterwards becomes quite dry and friable. Hence the popular name, "dry rot," which alludes to the last and most frequently observed stage of decay.'

The depletion of the more matured forest trees resulting in the importation of immature wood is said to be one of the contributory causes of the spread of the disease.

Spores may exist in the earth arising from the roots of trees or other source.

The rapid completion of a house before the materials of which its carcase is constructed have had time to dry thoroughly conduces to the germination of dry rot.

A warm, damp atmosphere surrounding the wood, such as exists under a floor immediately over the ground and in unventilated cellars, is another condition conducing to the spread of the disease.

Although, as above remarked, immature or imperfectly seasoned timber is said to be a cause of the spread of the disease, yet thoroughly matured and sound timber in a warm, moist atmosphere will readily fall a prey if attacked by the mycelium of dry rot once a spore has been introduced.

It has been proved that the spores of the disease can be carried from house to house on the clothes or tools of workmen, and that wood can be infected from a spore on a carpenter's saw.

From the foregoing it will be seen that the disease may have been introduced (*a*) in the timber, (*b*) from the adjacent earth, and (*c*) accidentally by the importation of a spore. These are conditions over which architects have obviously no control."

COURT OF COMMON COUNCIL.

A MEETING of the Court of Common Council was held at the Guildhall on Thursday last week, the Lord Mayor presiding.

Street Improvements.—The Improvements and Finance Committee submitted arrangements for acquiring the following properties for street widening purposes:—The leasehold and trade interest of the premises No. 130, Bishopsgate-street Without, for the sum of 1,175*l.*; the leasehold and trade interest of the premises No. 128, Bishopsgate-street Without (King's Arms public-house), for the sum of 11,550*l.*; the freehold interest of the ground required to widen the public way in front of No. 62, Fleet-street, for the sum of 725*l.*; the freehold interest of the ground required to widen the public way in front of No. 83, Fetter-lane, for the sum of 750*l.*—The Court approved.

Blackfriars Subways.—The Streets Committee, reporting as to the construction of the subways for pedestrians at Blackfriars, stated that the works have now been completed, at a total cost of 25,869*l.* 13s. 9d.

Preference for British Manufacturers.—The General Purposes Committee, reporting on a reference to consider as to the expediency of directing that in future a clause be inserted in all tenders and contracts for the supply of manufactured articles required for the Corporation, "that such articles should be of British manufacture," recommended the inadvisability of giving effect thereto as suggested, but that preference be given to such goods wherever possible and practicable, and that a clause be inserted in all tenders accordingly.—The Court agreed.

Illustrations.

NEW EXAMINATION HALL FOR THE ROYAL COLLEGE OF PHYSICIANS AND THE ROYAL COLLEGE OF SURGEONS.

WE illustrate this week the first premiated design in the competition for the new Examination Hall for the Royal Colleges of Physicians and Surgeons, to take the place of the one shortly to be vacated on the Victoria Embankment. The new building is to be erected in Bloomsbury, with a frontage to Queen-square.

The scheme is planned to form a compact block on the front of the site. The students enter on the basement level at the rear near their cloakrooms, and do not confuse with the official business of the ground floor.

The administrative portion of the building has been placed to the front of the site, so that callers can reach either of these rooms without mixing in the general circulation of students. The waiting-hall is placed at the back in communication with both staircases

NEW EXAMINATION HALL
PERSPECTIVE VIEW

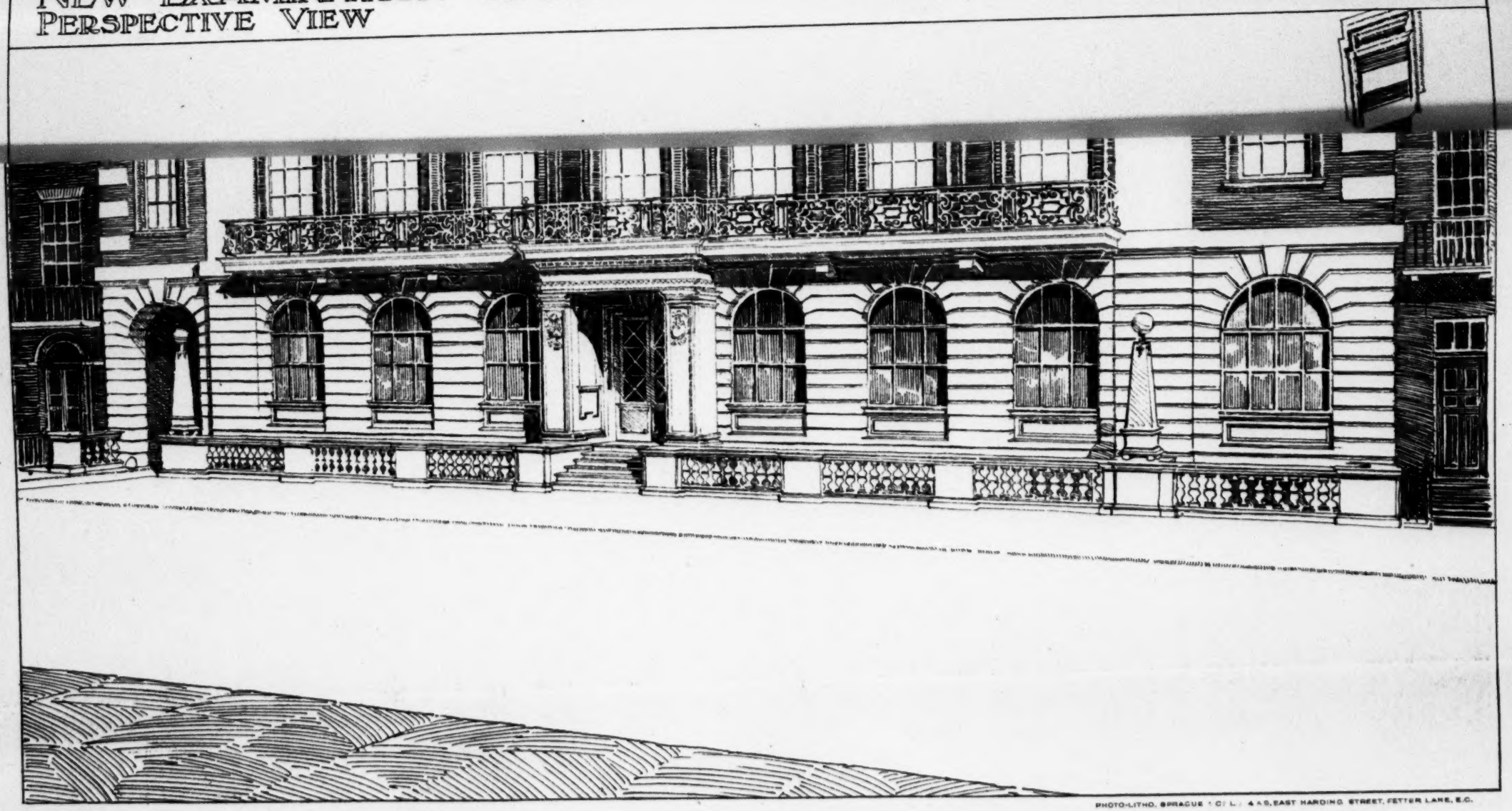

PHOTO-LITHO. SPRAGUE & CO. LTD. 44 & 45, EAST HARDING STREET, FETTER LANE, E.C.

SELECTED DESIGN FOR EXAMINATION HALL, ROYAL COLLEGE OF PHYSICIANS AND SURGEONS.—MR. A. N. PRENTICE, F.R.I.B.A., ARCHITECT.

the timber, which afterwards becomes quite dry and friable. Hence the popular name, "dry rot," which alludes to the last and most frequently observed stage of decay.'

The depletion of the more matured forest trees resulting in the importation of immature wood is said to be one of the contributory causes of the spread of the disease.

Spores may exist in the earth arising from the roots of trees or other source.

The rapid completion of a house before the materials of which its carcase is constructed have had time to dry thoroughly conduces to the germination of dry rot.

A warm, damp atmosphere surrounding the wood, such as exists under a floor immediately over the ground and in unventilated cellars, is another condition conducing to the spread of the disease.

Although, as above remarked, immature or imperfectly seasoned timber is said to be a cause of the spread of the disease, yet thoroughly matured and sound timber in a warm, moist atmosphere will readily fall a prey if attacked by the mycelium of dry rot once a spore has been introduced.

It has been proved that the spores of the disease can be carried from house to house on the clothes or tools of workmen, and that wood can be infected from a spore on a carpenter's saw.

From the foregoing it will be seen that the disease may have been introduced (*a*) in the timber, (*b*) from the adjacent earth, and (*c*) accidentally by the importation of a spore. These are conditions over which architects have obviously no control."

COURT OF COMMON COUNCIL.

A MEETING of the Court of Common Council was held at the Guildhall on Thursday last week, the Lord Mayor presiding.

Street Improvements.—The Improvements and Finance Committee submitted arrangements for acquiring the following properties for street widening purposes:—The leasehold and trade interest of the premises No. 130, Bishopsgate-street Without, for the sum of 1,175*l.*; the leasehold and trade interest of the premises No. 128, Bishopsgate-street Without (King's Arms public-house), for the sum of 11,550*l.*; the freehold interest of the ground required to widen the public way in front of No. 62, Fleet-street, for the sum of 725*l.*; the freehold interest of the ground required to widen the public way in front of No. 83, Fetter-lane, for the sum of 750*l.*—The Court approved.

Blackfriars Subways.—The Streets Committee, reporting as to the construction of the subways for pedestrians at Blackfriars, stated that the works have now been completed, at a total cost of 25,869*l.* 13*s.* 9*d.*

Preference for British Manufacturers.—The General Purposes Committee, reporting on a reference to consider as to the expediency of directing that in future a clause be inserted in all tenders and contracts for the supply of manufactured articles required for the Corporation, "that such articles should be of British manufacture," recommended the inadvisability of giving effect thereto as suggested, but that preference be given to such goods wherever possible and practicable, and that a clause be inserted in all tenders accordingly.—The Court agreed.

Illustrations.

NEW EXAMINATION HALL FOR THE ROYAL COLLEGE OF PHYSICIANS AND THE ROYAL COLLEGE OF SURGEONS.

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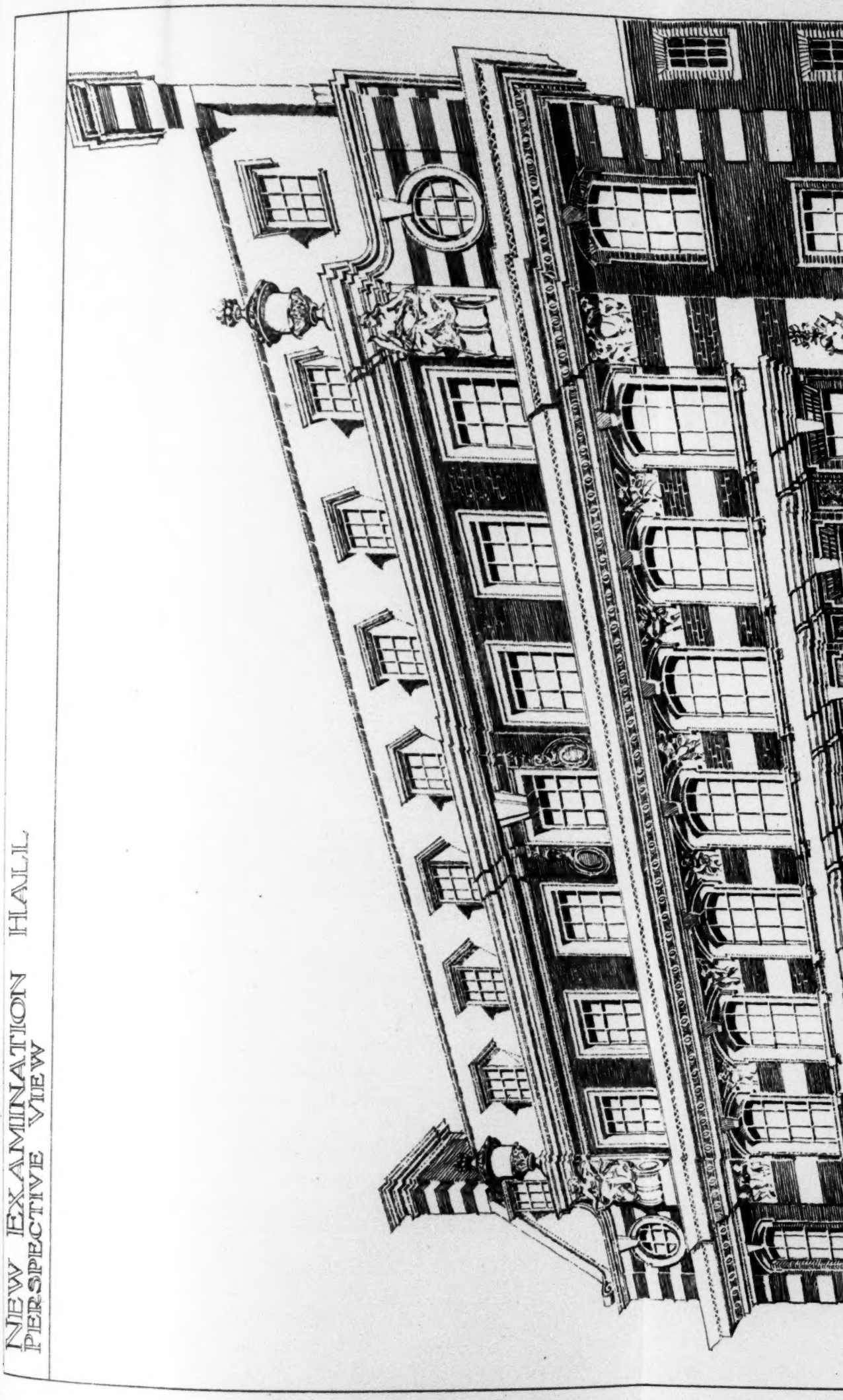


NEW EXAMINATION HALL.
PERSPECTIVE VIEW

THE BUILDER, MARCH 26, 1910.

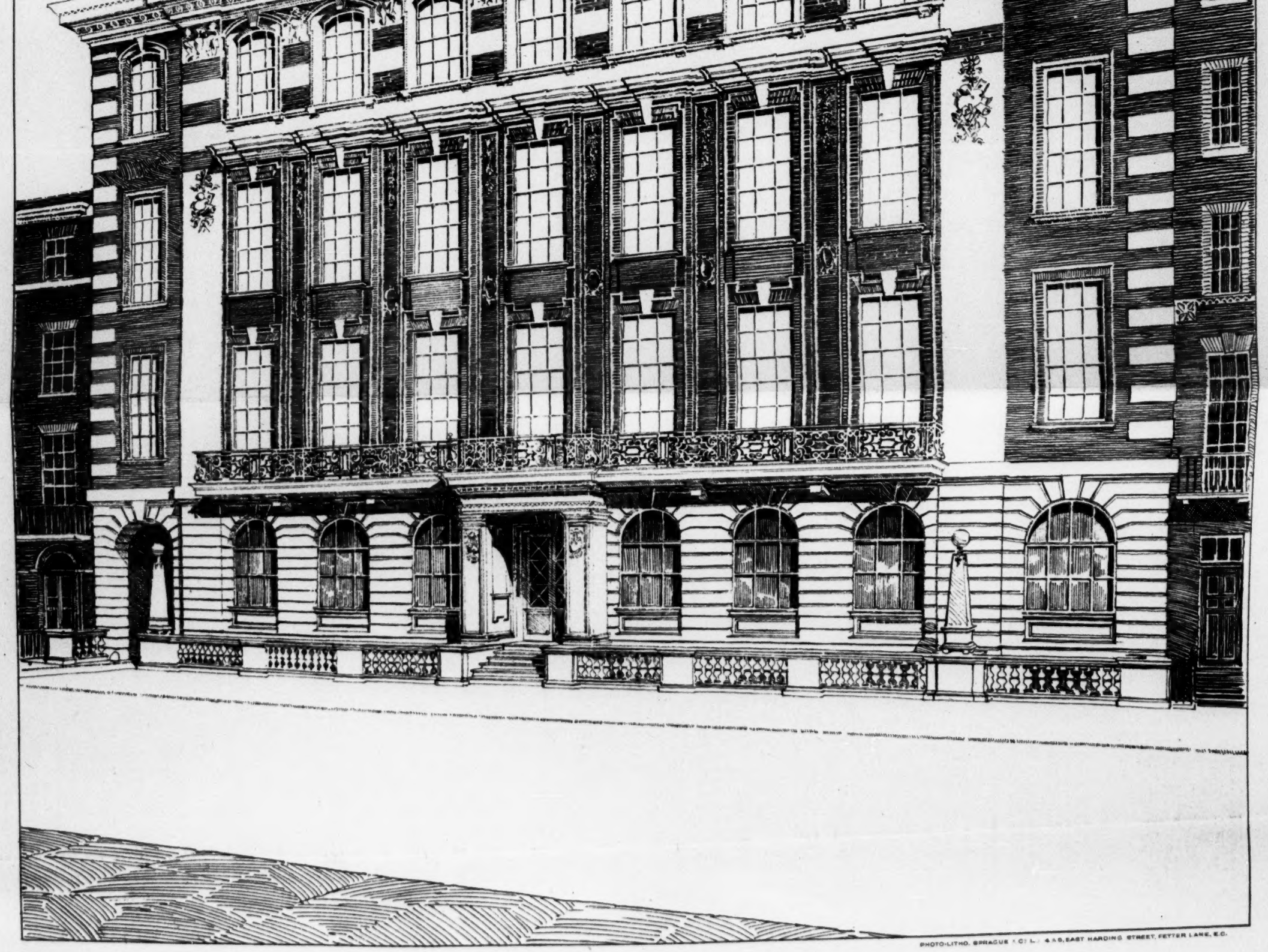


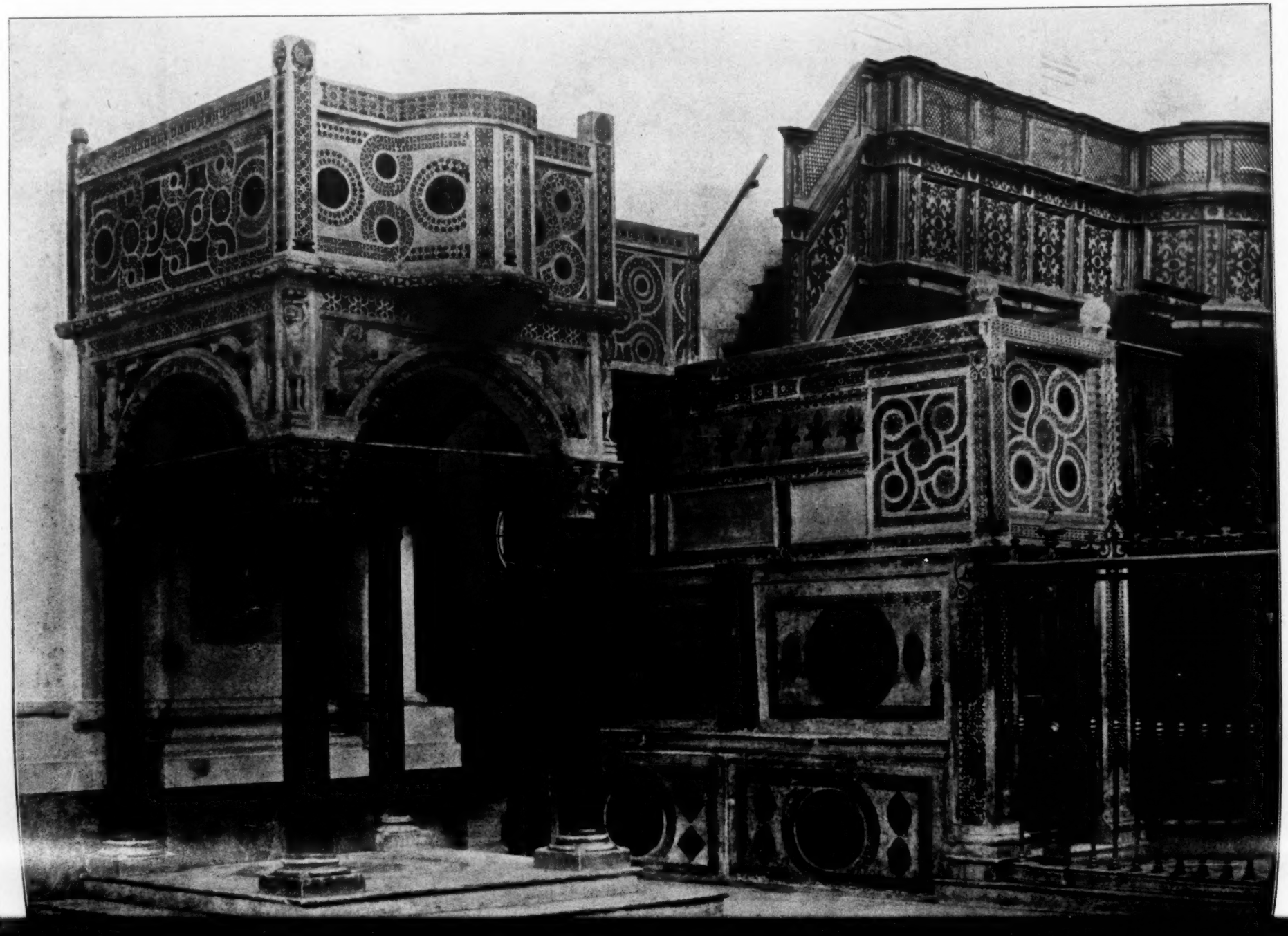
PHOTO-LITHO. SPRAGUE & CO. L.D. 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

SELECTED DESIGN FOR EXAMINATION HALL, ROYAL COLLEGE OF PHYSICIANS AND SURGEONS.—Mr. A. N. Prentice. F.R.I.B.A., Architect.

THE NAVE, LOOKING WEST.

Sprague & Co., Ltd., Printers, 4 & 5 East Harding St., E.C.

THE CATHEDRAL, SALERNO.



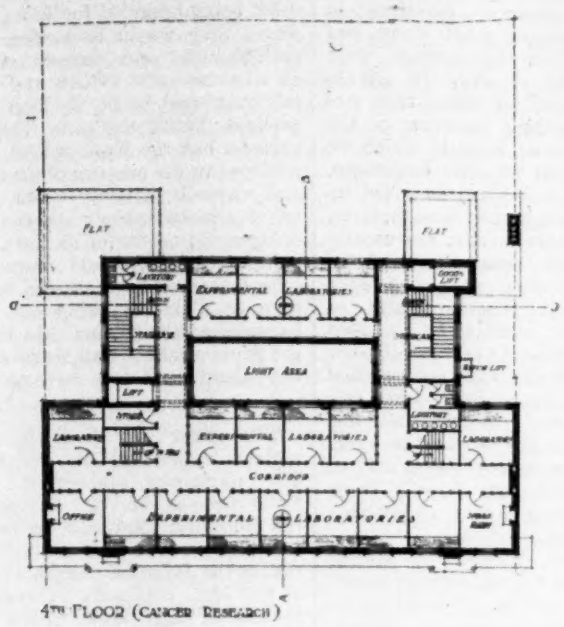
THE GOSPEL AMBONE AND PASCHAL CANDLESTICK.

Sprague & Co., Ltd., Printers, 4 & 5 East Harding St., E.C.

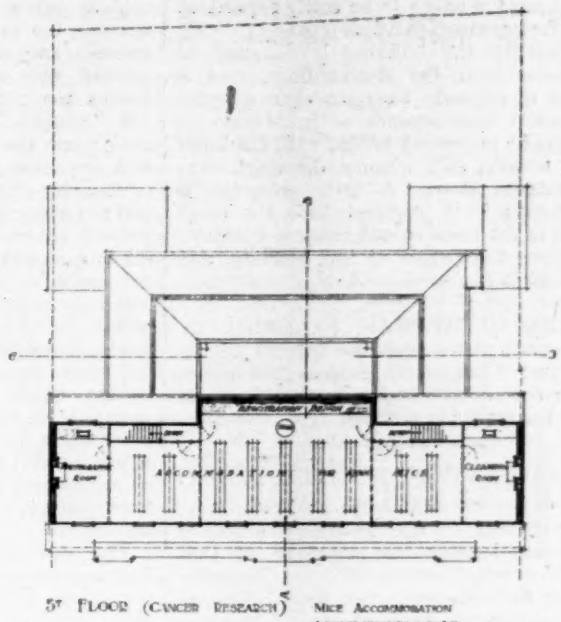
THE CATHEDRAL, SALERNO.

NEW EXAMINATION HALL

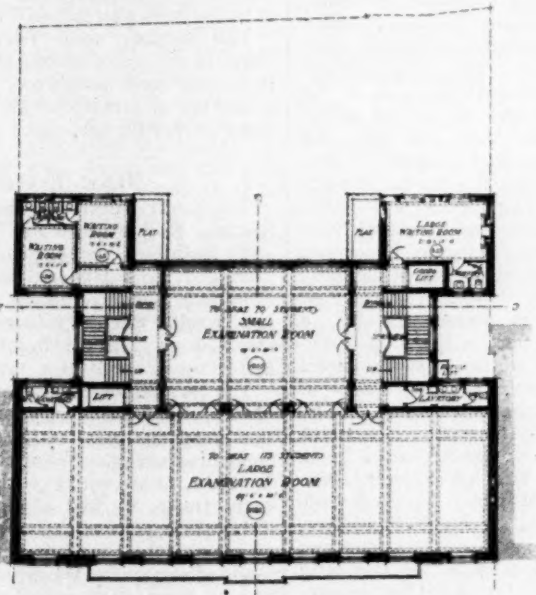
FOR THE ROYAL COLLEGES OF PHYSICIANS AND SURGEONS



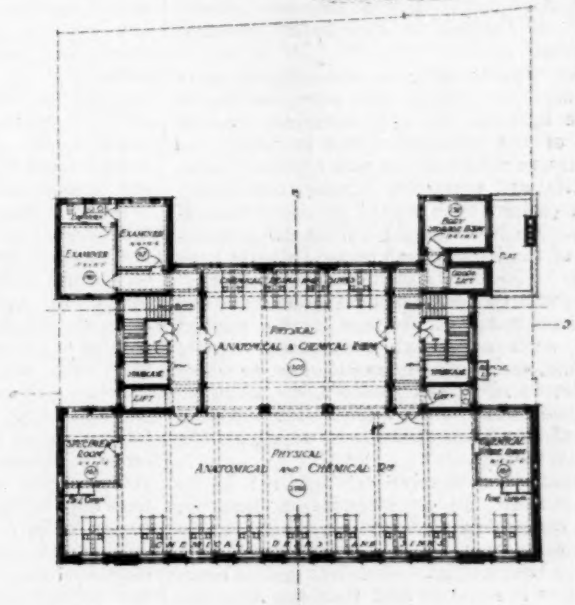
4TH FLOOR (CANCER RESEARCH)



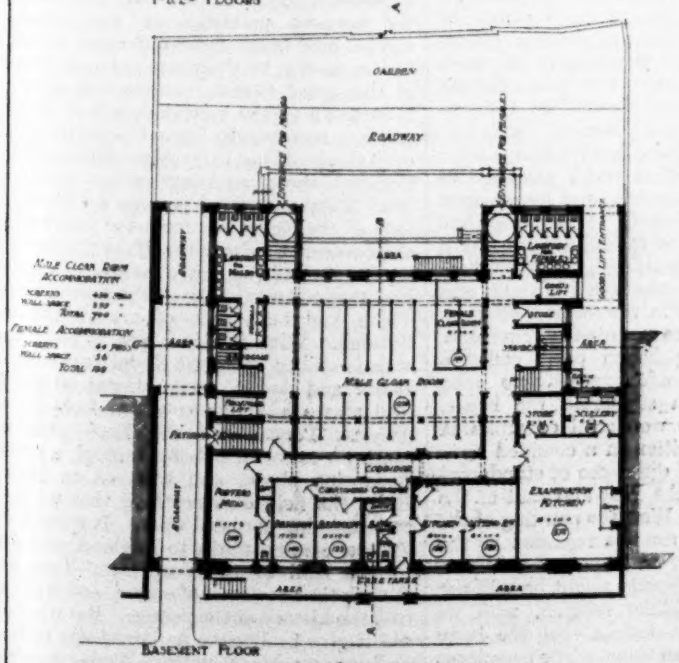
5TH FLOOR (CANCER RESEARCH) MICE ACCOMMODATION



1ST & 2ND FLOORS



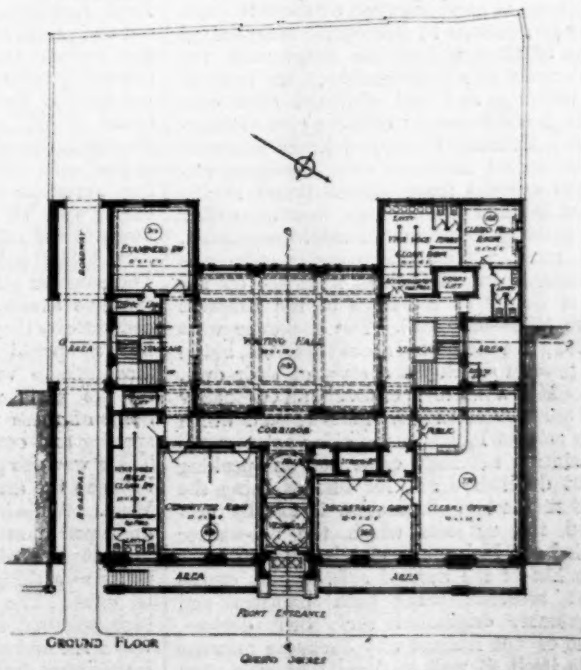
3RD FLOOR



BASEMENT FLOOR

QUEEN SQUARE

BASEMENT FLOOR



GROUND FLOOR

QUEEN SQUARE

GROUND FLOOR

the entrance corridor is so arranged that these staircases can be reached from the main entrance without entering the waiting-hall when the *viva voce* students are there.

The large examination halls have been placed along the front site, with the smaller examination halls on a central axis with them; this allows the rooms to be easily supervised when they are used jointly.

Externally the building is designed to harmonise with the surroundings, and is treated in an early Georgian style adapted to modern requirements as to height. It is proposed to use red bricks, with the lower story, cornice, and window dressings, etc., in Portland stone. A little sculpture is introduced; it is proposed that the small figures in the frieze should carry instruments suggesting the nature of the building, and should be in low relief. A. N. PRENTICE.

THE CATHEDRAL, SALERNO.

THE four plates from the interior of the Cathedral of Salerno are given as illustrations to the first article in the present issue, to which the reader is referred.

THE CARPENTERS' HALL LECTURES:

JAPANESE DECORATIVE ART.

THE fourth of the Thursday series of free spring lectures was delivered at Carpenters' Hall, London-wall, on Thursday evening, the 10th inst., when Mr. W. Harding Smith, R.B.A., lectured on "Japanese Decorative Art." Mr. W. Crewdson, Chairman of Council of the Japan Society, presided.

The lecturer said that the subject, in its entirety, was really too extensive for a single lecture. He had, therefore, selected four of the principal forms in which the decorative art of Japan was expressed, viz., pictorial art, sculpture, lacquer, and metalwork (chiefly with regard to sword decoration). He had thought during the preparation of the lecture that its title should have been "The Decorative Art of Old Japan," since, with the incoming of Western ideas and customs, many of the uses for the applied arts, such as sword decoration, netsuke carving, and some forms of lacquer, to which he should refer, had passed away, although in some instances the artist's skill had been turned into other channels by supplying the foreign market.

Japanese decorative art was art in its fullest sense, an art intended to beautify. The contention that all Japanese art was decorative was borne out by many well-known authorities. Without much exaggeration it could be said that the Japanese were a nation of artists. The flexibility and suppleness of hand acquired by them through many generations in writing the complicated forms of their picturesque script with the brush must be a considerable factor in their art training, and had educated their eyes to appreciate beauty of form and arrangement. Although China and Korea exercised the strongest influence over Japanese art, it was evident from objects found in the burial mounds and dolmens that an earlier art, possibly indigenous, must have existed. The most reliable historians ascribe the commencement of Chinese influence on the art of Japan to the reign of the Empress Suiko (565—567 A.D.). The Japanese were not long in assimilating the art of China, but in the process developed a style of their own, and added a lightness of touch, an originality and boldness of design, and a humour which were seldom found in the older art.

Painting naturally came first in speaking about decorative art, for besides being the chief method of decoration it usually provided the subjects which the art-worker carried out in lacquer, metalwork, and other branches of the applied arts. Many of the great masters, being both painters and lacquerers, originated their own designs. Some of the reasons why Japanese painting lends itself so well to decoration were, first of all, its simplicity of purpose, and secondly its directness of method. Instead of the elaboration of the Western gallery picture, it was content to depict one idea, one theme. In many cases backgrounds were ignored. The absence of direct light and shadow, and also of the cast shadows, was another element in favour of decoration. As to the form usually taken by Japanese paintings in temples, the walls, sliding panels, doors, and screens, and sometimes the ceilings, were painted with designs *in situ*. In private houses the chief field for decoration was the "fusuma," a sliding partition of the room; but the principal form in which we find Japanese pictures was the kakemono, or hanging picture, that could be rolled up and put away when not in use; these pictures, painted either on paper or silk, are usually set in a mount of silk brocade, generally of two colours, which often formed a very pleasing combination. Another form of picture, called "gaku," mounted on a wooden frame, was sometimes seen; and yet another was makimono, which was rolled and unrolled in the hand, and corresponds with our picture-book, or album. There was only one place where the rolled picture could be hung, a recess called the tokonoma, where one, or at most three pictures, were shown. These were changed from time to time at different seasons and on special occasions.

The lecturer then referred to several Japanese pictures and schools, and gave some particulars of their authors. Proceeding, he said the more modern schools of painting appeal most strongly to the people of Europe, and this was quite natural, because it was a style which, being realistic, was more easily understood by them. The Shijo school, founded by Okyo towards the end of the XVIIIth century, strove to imitate nature more closely. Okyo's birds and fish, and Sosen's monkeys were good examples of this, and to some extent showed a leaning towards Western influence. The popular style called "Ukiyoye," or "passing world pictures," was perhaps the most interesting to Europeans on account of the record it gave of the daily lives of the men and women of Japan; its reputed founder was Iwasa Matahei, a painter of the latter part of the XVIth century, who was one of the first to depict dancing girls and women. This school of genre painting, as it may be termed, had no followers until, towards the end of the XVIIth century, Hishigawa Moronobu issued block prints of the same kind of subjects, these were only in black and white, but soon these began to be coloured by hand in orange, green, and yellow, and were sometimes emphasised by black lacquer. In the early and middle part of the XVIIIth century the designers of the Torii family, founded by Torii Kyonobu, began to issue prints in red and green, called Beni-ye; later on yellow was added, and the overlapping of these producing other colours. But it was not till we come to Harunobu, about 1760, that we found a full palette of colours employed. Though rather effeminate in style, Harunobu's prints were the first in which elegance of line, agreeable composition, and harmonious colour were all combined. From this time down to the middle of the XIXth century a great host of colour print designers flourished. These colour prints were issued in single and multiple sheets, and in the form of albums; occasionally they were mounted as kakemono, but a special long-shaped print called a Hashirakake was made expressly to hang on the posts which supported the house. Some of these were wonderful examples of spacing and composition in a confined area. There was one great difference of standpoint between the art of the East and that of the West. While in the West the painting of the undraped human form was regarded as the highest aim of art, in Japan the human figure as a thing of beauty might be said not to exist. The Buddhist religion, with its high spiritual ideals, taught that the body was a vile and unclean thing. The beneficent dieties were draped, while those of demoniacal origin were represented as nearly nude.

Black and white was practically the only method employed by the early schools, who derived their inspiration from China. Colour, if used at all, was used very sparingly. He was speaking, of course, of the secular painters, for in the Butsu-ye, or Buddhistic style, strong colours and much gilding were used, being intended to decorate the temples, where they would harmonise with the rich architecture and dresses of the priests. In all subsequent schools and styles Chinese ink continued to be the chief medium, less perhaps during the early Tosa and Korean periods, but the Kano school, on the whole, returned to the practice of the earlier masters, and virtually ignored colour, depending for effect almost entirely on the strength and calligraphic nature of its lines. Even in the paintings of Okyo and Sosen, of the Shijo school there always seemed to be an undertone of Chinese ink, which softened and harmonised the colours. In the paintings of the popular school, and Hokusai in particular, the colours used were more positive.

Sculpture.

The sister art of sculpture found its highest expression in religious subjects. The numerous statues of the Buddha, Boddhisatwas, and the various members of the Buddhist Pantheon, to be found in the temples, were sufficient testimony to the skill of the Japanese sculptors in every branch of the art. Sculpture in wood was a great feature of their work, figures of very large size being often met with. Priests and men of noble birth also followed the art.

The lecturer then referred to various works of sculpture, carving of masks, etc., and to lacquer and metalwork, etc., and showed a number of lantern views in illustration of some interesting remarks.

MURAL PAINTING.

The tenth lecture of the series of Carpenters' Hall lectures on "Arts Connected with Building," arranged by the Carpenters' Company, was delivered in the Hall of the Company, London-wall, E.C., on Wednesday last week, when Professor G. E. Moira lectured on "Mural Painting." Mr. Wm. Robertson, Past-Master, presided.

The lecturer said that mural painting, one of the oldest forms of expression, had had, like most of our best traditions, a very chequered career. We need not go so very far back, or we could go right back to very early times, to find the great use it had always been put to—that of giving the history of nations that perhaps without this facile mode of expression we should be in ignorance of; so from that point alone it was all-important. If we had not, for instance, the tempera paintings in the tombs of Egypt, how much more difficult it would be for us to-day to decipher, not only the life of this great nation, but the costumes, and even down to the minute details of all their crafts, metalwork, wood construction—even shipbuilding, in its every detail. Why? Because these paintings were transcripts from Nature, glorified perhaps a little in the case of the Egyptians from the desire of the chief mourner to have the life of the departed handed down in as rosy a manner as possible. But that we must take as the artistic licence which had been part of art all the way through. With this as a peg to hang their artistic ability upon, the Egyptians taught us colour and design—conventional, of course. And so we had this tradition from Egypt, Assyria, Persia, and the East, gradually coming westward, passing through a certain Byzantine phase, and then on to Italy—Italy, the field of everything that we knew as interesting in mural work. It spread over France, coming north to England, and even to the Hall of the Carpenters' Company. It took time to come, of course, and it always told the history of the people. But what else did it give? It gave us knowledge of these ordinary workmen, with no Royal Academy Schools of Education, no Prix de Rome Concours as a hall-mark of their ability,

unconsciously laying down a foundation of decorative design which was to have such enormous influence on the great work of Italian mural decoration of the XVth and XVIth centuries. At the same time we must remember that every stroke these men did was not only paint, but literature, literature because it was telling the story of their time far more beautifully than mere prose alone, and in a far more convincing way than mere description.

One day, far away from the laying down of this great tradition of coloured historical description, and many centuries after, came Giotto and the hundred and one other great Italian decorators, who, though they stuck to the tradition of being in a sense historians, were rather more artistic, as we, alas, understood the word to-day! It was inevitable. The culture of the masses demanded something more; they had learnt to see stereoscopically, and the figure, instead of retaining that flat simplicity that gave the Egyptian painting such character and distinction, became more rounded, and the art of seeing a cast shadow, which in reality meant the commencement of the realisation of tone, crept in. It was the awakening of a new era, and, as revelation, swept away much that was to be regretted; still, it was advancement, and as such was all right, because these men were painting their time, using the people around them as their models, mixing them up with characters out of religion and allegory in such a way that the lesson they were teaching should be all convincing to those about to be taught. To all these men, Giotto, Botticelli, and so on, the real tradition of decorative mural work had not been sealed. Then came about the use of varnish, which led to the illuminated missal period, which almost obliterated the larger and broader sense of wall decoration and ultimately killed it. It revolutionised the great tradition of decorative work which had been such a glory in the past, and it was really the commencement of the Royal Academy and suchlike institutions. But there were men who were trying to bring back the traditions of the past, and perhaps this varnish would in time be in a great way forgotten.

But what he wanted to bring before them was not so much how these men did their work, or the medium they used, for most of that kind of information could be found in handbooks and museums. What was more interesting was the reason of such works, the difficulties of the artists, and how they overcame them. As to-day, so then; the man who paid the piper chose the tune. The Franciscans employed Giotto, whose education had been on the stereotyped lines so prevalent then—on the lines of convention derived from Byzantine times; and when one realised how he had dealt with a subject like the life of the great patron Saint Francis, hardly a century after St. Francis had lived—and time then went slower than it does to-day—one could not but marvel at his work in the church at Assisi and his admirable treatment of his subject.

The lecturer then showed illustrations of the work and a number of other illustrations of mural decoration. Giotto introduced in his decoration the people he saw around him; and the marvellous perspective showed the revolution which had taken place from the ordinary type of work which was understood to be decorative. Illustrations were shown of the work of Ghirlandajo, Botticelli, Raphael, Pinturicchio, etc.

Coming to modern work, he said that the Wellington and Nelson frescoes in the House of Lords, done by Daniel Maclise, while they had faults which were to be regretted, represented the time, and were an attempt to do something of the time. We laughed at their early Victorian characteristics, but one could not help admiring them as the work of a man who was doing something that appealed to him, and of which he knew something. One did not like to criticise anything that Lord Leighton did; still, the work he did at South Kensington direct upon the wall in the Gambier Parry medium would, he felt, in a short time be more open to criticism than the House of Lords frescoes by Maclise. The work of Puvis de Chavannes at the Sorbonne had a character of its own, and would always retain that character. The artist was one of the greatest decorators of modern times, simply because he brought back the tradition of the early Italians and placed it on a footing that we could understand, and done it technically in a way that was possible for our northern climate. It was done on canvas painted with wax—an oil-paint with not so much oil as was ordinarily used.

The lecturer also showed illustrations of part of his scheme of decoration at the Unitarian Church at Liverpool embodying the "Raising up of Truth by Time," and a good many illustrations of the work he and Sir William Richmond had carried out at the Central Criminal Courts, the new Old Bailey.

He said they did everything they could in conjunction with the architect, the late Mr. Mountford, to secure a perfectly dry and therefore more or less permanent wall upon which to place their work. This was arranged as follows:—First, the outer wall of stone and brick, then an air space; then a wall of one brick thick, tied here and there, the insides of these walls receiving a coat of paint. Then came another air space and then another wall, of reinforced stick and rag—French plaster cast with layers of canvas and battens of wood with a thin structure of woven steel, galvanised, embedded at the back. This last wall was slightly more forward at the top than at the botton, this being done in order to prevent a certain amount of dust settlement. This was his idea, and how it would work out was a doubtful matter, but it was worth trying. Sir William Richmond had a thin coat of marble dust and lime spread over the surface on which he painted *in situ* in tempera, and he had received from Sir William the following description of his method:—

"The wall was prepared with slaked lime and marble dust. Two coats, one thick, the other thin. I tried three surfaces, one rough, next less rough, the other quite smooth; the last was by far the better method for the ground. When the two coats are nearly dry a thin layer of lime is painted over the whole surface, then rubbed down; but great care must be taken that the brush employed has not been used for white lead; it must be a new one. I was troubled by some carelessness on this score, which was, however, remedied by Professor Church, *i.e.*, a certain black stain. The design was then drawn in in charcoal, corrected, and then redrawn in raw sienna and white. Under blue I painted red, under flesh white, black, and raw sienna, warm and shade cool in lights; all else was painted at once as much as possible. *No* glazing, because it tends to darkness; all tints mixed with white, even glazing tints. Colours ground in water. In their powder, mixed fresh every day with the yolk of an egg; an equal body of egg mixed with an equal body of pigment. I took care not to lose my ground, because, by retaining it, a greater brilliancy is acquired. It is well to mix some vinegar with the egg; it keeps it fresh. *No* bad eggs should be used; they set up fermentation. The medium with which I painted was milk with no water; this causes the egg to dry as hard as stone, and is very binding. This method of painting includes all that can be done in oil; one can paint thick or thin, retouch as much as one likes, and scrumble in their colour for atmosphere, or where one needs to grey or lighten a tone. The colours I used are zinc white, N. yellow, yellow ochre, raw sienna, light red, Indian red, ivory black and cobalt, and a little terra verde. It and yellow ochre must be used carefully, raw sienna also, as all three colours are apt to darken from a distance. The great principle is that the drawing shall be sound at starting, for it is well to have to make no important changes, especially such as would involve painting dark over light. The yellow of the yolk entirely disappears in time, leaving the colours pure and fresh. Blue is a bit difficult to manage; it is best when painted over red if it is to be a purple blue, over yellow if a green blue, and it should not be loaded, as that results in a heavy effect."

It was important to have a good scale model to start with. He (the lecturer) painted on canvas, very open. He laid a thin coat of marble chips and white lead, doing most of the more laborious work for the lunettes in the studio and the finishing *in situ*. The canvases were fixed to the walls, which were prepared with two to three coats of white lead—very thick white lead and strong varnish, thus embedding the canvas in two layers of thick paint, in this way entirely shutting it off from access to the outer air. He painted in oil paint with a medium of hard white wax dissolved in turps: One quart of turps, ¼ lb. of hard white wax, 2 oz. of spike oil, 2 oz. of copal varnish, putting the oil and the varnish into the dissolved wax before it cooled down.

In concluding his remarks, the lecturer said that he believed that in decoration, as in ordinary easel pictures, the most interesting works in the past and the most interesting of the present were those that dealt with contemporary events either in allegory or reality. We were always told that the old men had a much better chance with their periods than we had—the early Florentine costumes, for instance; but surely these men had difficulties as great as the trousers and tall hat of to-day? But they simply told the truth, but to tell the truth in art to-day was almost as criminal an offence as to tell it in politics. A decoration formerly in the Hall of the Carpenters' Company, painted over in some troubled time, and discovered in 1845, forcibly brought home what he had been saying, *i.e.*, that the customs of the period were just as possible to deal with in decoration as allegory or people of the past. Some excellent work was being done to-day, and he might mention Mr. Brangwyn's decoration at the offices of the Grand Trunk Railway Company; there was a certain amount of allegory about it, mixed with events and people of our everyday life, which made it very interesting. We did not want the fluffy Greek maiden in our work; we wanted to-day. He was certain that the motor-car in the street and the man with a tall hat were not more difficult to treat than the man in tights and the sugar-loaf thing he put on his head seen at the time of Botticelli. They had their difficulties in the past, just as we had to-day, but we were too afraid of what our neighbour would say. They should try and forget that and do something on their own account.

On the motion of the Chairman, a vote of thanks was accorded to the lecturer.

THE STUDY OF TREES.

On Thursday last week the sixth and last of the series of Thursday lectures was given at Carpenters' Hall by Dr. Augustine Henry, M.A., F.S.A., on "The Study of Trees." In the absence, through illness, of Sir Herbert Maxwell, Bart., Lord Kesteven presided.

Dr. Henry, who illustrated his lecture with a large number of lantern photographs and diagrams, said that an important aspect of the subject, and one that was not always kept in view by growers of timber, was species. Groups of two species were found occurring in most European trees—two each of oak, elm, birch, white poplar and black poplar, which were everywhere common in Central Europe. These pairs were, broadly speaking, attached, and they represented an important fact. In the days when man was a hunting animal there were two classes of ground—large tracts of alluvial land and hilly land. It was found that one of each species was adapted to each of these classes of ground, and the species which grew most favourably on dry, hilly ground had, for securing a larger supply of moisture than the ground afforded, some natural provision for retaining and absorbing rain and dew through the leaves. It followed that a species which had not this provision

would, if planted on hilly land, be at a disadvantage, and the result would be slower growth and poorer quality. It was found, however, that a nurseryman made no discrimination with regard to species, but as an oak with 700,000 leaves could evaporate 111 tons of water between June and November, the point was most important. Of course, an oak which lived in an alluvial tract had no difficulty about water, but within the last 100 years most of the pedanculata oak had been planted, and this was wrong, because foresters could, as a rule, only plant on hilly soil. The sessile oak had a covering of hair to prevent evaporation; the common birch had a gland containing varnish which spread over and protected the leaf, and this gland also took in dew and rain. This tree could be grown on the driest soil. The silver birch was always found wild on peat and swamp, but this also was adapted by nature as the others, because the acids in peat prevented the root taking up as much moisture as it otherwise would.

Having considered the characteristics of pure species, the lecturer went on to speak of first crosses. He said we could now produce as first crosses trees which would be of great value, and by this means it might be possible greatly to increase the rate of growth. This, in regard to ash—the most valuable of all our common timber—and walnut, would be of importance, especially if it was found that these quick-growing crosses would reproduce faithfully. Black Italian poplar was often erroneously supposed to be an American tree, but there was no doubt it originated in Europe. It was a more rapid grower than the Black English poplar, and therefore more useful, as foresters always looked to vigour of growth. This tree would make 2 cubic ft. of growth per year, and in Belgium the peasants planted round their holdings with them, as the foliage was not sufficiently dense to affect the growth of crops by obstructing the light. The timber was to a high degree non-inflammable, and in this connexion the London County Council might permit the use of black poplar instead of teak. The willow was a valuable tree, especially when grown for making cricket-bats, but there the rate of growth was important as affecting the weight of timber, the difference between a good and a bad bat being a very few ounces. Of elms, the most useful was the Huntingdon, and it was a rapid grower. Bath in 1824 planted every kind of elm, but by last Christmas the Huntingdon elm had made by far the most growth.

Lord Kesteven proposed a vote of thanks to Dr. Henry, and said that, looking at the practical aspect of forestry, it was clear it found employment for the same number of men as agricultural land, and he, on his own estate, found it provided work for men at the time when their other occupations failed to do so. He had men come back to him regularly each winter who had no difficulty in finding work at other seasons which was closed to them then.

The vote of thanks was carried.

PADDINGTON BATHS, BAYSWATER. — After protracted negotiations the baths and washhouses in Queen's-road have been acquired by Messrs. William Whiteley, Ltd., at a price of 82,000*l.*, for an extension of their premises. The assessment was arrived at by the Local Government Board, who appointed Mr. F. J. Willis, Inspector, to hold an inquiry in March last, and Mr. John Murray to value the freehold site and property, and it is 22,000*l.* more than was originally offered by the purchasers. The building was erected and fitted with plant at an inclusive cost of 50,680*l.*, upon a site which the Paddington Vestry bought in 1871 for 8,250*l.* The buildings were fitted with new machinery and reconstructed nearly twenty years ago after plans and designs by the late Lewis H. Isaacs. It is understood that the Borough Council will consider the question of providing improved and more convenient baths and washhouses, and, perhaps, a new Town Hall, with the proceeds of the sale.

THE CONCRETE INSTITUTE:
THE LE CHATELIER BOILING TEST OF PORTLAND CEMENT.

THE eighth ordinary general meeting of the Concrete Institute was held at the Royal United Service Institution, Whitehall, S.W., on Thursday last week, Mr. Bertram Blount presiding, when Mr. D. B. Butler, A.M.Inst.C.E., F.C.S., read a paper entitled "Notes on the Le Chatelier Boiling Test of Portland Cement," of which the following is an abstract:—

The soundness of Portland cement, *i.e.*, its freedom from expansion, the author thought, was its most essential property, and should be always the first thing to be determined in estimating the constructive value of a sample. It was obvious that, notwithstanding other highly desirable qualities which a cement might possess, such as great strength or large sand-carrying capacity, if it was unsound, and contained certain elements which subsequently caused expansion, with, in extreme cases, disintegration and crumbling, it was not only of no use as a constructive material, but was at once converted into a destructive material. Although with the improved methods of manufacture obtaining of recent years these extreme cases of disintegration had become more and more rare, expansion of a more or less dangerous nature was not infrequently met with.

The original test for soundness, the author explained, was based more or less on working conditions, *i.e.*, pats or cakes of neat cement, plunged into cold water when set, or after twenty-four hours in air, and examined at intervals; if at the end of a month they showed no signs of cracking or distortion, and adhered firmly to the glass plate on which they were made, the cement was considered satisfactory as regards soundness. This test laboured under the obvious disadvantage that twenty-eight days had to elapse before a definite opinion could be pronounced and the cement finally accepted for use, a delay that was frequently impossible in practice, although it might be argued that the generally specified twenty-eight days' tensile tests laboured under the same disadvantage.

To obviate this dong delay several accelerated tests for soundness have been evolved from time to time. About thirty years ago the late Henry Faija introduced a test for soundness, consisting in subjecting cement pats to seven hours in moist air of 110 deg. Fahr., followed by seventeen hours in warm water of 120 deg. Fahr., which enabled an opinion to be formed in twenty-four hours instead of having to wait twenty-eight days as formerly.

The next accelerated test was that of M. Deval, brought out about ten years later; after twenty-four hours in air or under a damp cloth, at ordinary testing-room temperature, and two days in water of 176 deg. Fahr., the strength developed was supposed to be comparable with that of one day air plus six days in ordinary cold water; while after a further four days in hot water, *i.e.*, one day in air and six days in hot water, the strength developed was supposed to be comparable with one day air plus twenty-seven days' cold water.

The Boiling Test.

From the 176 deg. Fahr. of the Deval test it was but a step to the boiling test now in vogue, and, having regard to the difficulty of always maintaining an equable temperature of 176 deg. Fahr., the boiling test is certainly considerably simpler; the ordinary qualitative boiling test consisted of allowing a pat to set twenty-four hours in a damp box of 60 deg. Fahr. and then placing it in cold water, which was gradually raised to boiling and maintained at that temperature for six hours, after which treatment the pat should show no signs of warping or cracking; it was sometimes further specified that the edges of the pat should also break off with a sharp, crisp ring, which was a very sure indication that it was free from cracks or flaws of any kind. The foregoing tests were all of a qualitative order, and depended more or less on the personal experience of the operator as to whether the results obtained were seriously defective or not.

Bauschinger Apparatus.

The most accurate quantitative method of measuring expansion or contraction, whether in air, cold water, or by the various accelerated tests, was the Bauschinger micrometer calliper apparatus, in which the test pieces consisted of prisms or square bars 100 mm. long and 22 mm. by 22 mm. cross-section; the delicacy of the instrument was such that variations in the length of the bar to within $\frac{1}{200}$ mm., or 0·005 per cent., could be determined with certainty. It, however, required very careful expert handling, and was somewhat expensive, the equipment, including moulds, costing about 12*l.*

The Le Chatelier Test.

The only other quantitative method of note for determining expansion was that devised by M. Le Chatelier, which was adopted by the British Standards Committee in 1904 as the standard method of determining the the soundness of cement. The description and method of working, taken from the revised British Standard Specification of 1907, was as follows:—

"The cement shall be tested by the Le Chatelier method, and shall in no case show a greater expansion than 10 millimetres after twenty-four hours' aeration and 5 millimetres after seven days' aeration.

The apparatus for conducting the Le Chatelier test consists of a small split cylinder of spring brass or other suitable metal of 0·5 millimetre (0·0197 in.) in thickness, forming a mould 30 millimetres (1 3-16 in.) internal diameter and 30 millimetres high. On either side of the split are attached two indicators with pointed ends, the distance from these ends to the centre of the cylinder being 165 millimetres (6½ in.).

In conducting the test the mould is to be placed upon a small piece of glass and filled with cement gauged in the usual way, care being taken to keep the edges of the mould gently together while this operation is being performed. The mould is then to be covered with another glass plate, a small weight is to be placed on this, and the mould is then to be immediately placed in water at a temperature of 58 deg. to 64 deg. Fahr., and left there for twenty-four hours.

The distance separating the indicator points is then to be measured, and the mould placed in cold water, which is to be brought to boiling-point in fifteen to thirty minutes, and kept boiling for six hours. After cooling the distance between the points is again to be measured; the difference between the two measurements represents the expansion of the cement, which must not exceed the limits laid down in this specification."

It certainly had this advantage over the Bauschinger apparatus, that it was cheap and simple and involved no costly apparatus, but whether it was equally accurate was quite open to discussion. In the course of ordinary professional testing work the author stated he had had to carry out many thousands of tests for soundness by the Le Chatelier method, and the conflicting results he had sometimes obtained had led him to the conclusion that where the condemnation of a cement for unsoundness was concerned the results given by the Le Chatelier test should not be too rigidly interpreted.

The author then quoted series of experiments to show the variable results which might be obtained by different operators, and even by the same operator working under exactly the same conditions. In order to ascertain if differences in the elasticity of the moulds were in any way responsible for the variable results obtained the author devised a special apparatus. The variation given by different moulds was considerable. However, the results did not definitely point to differences in the elasticity of the mould as being responsible for the variable results obtained, since No. 10, which was an extremely weak mould, gave the least expansion in two cases out of three. It was thought possible that the position of the test pieces in the boiling bath, whether in the centre or round the outside, might have had something to do with the variations found, and tests were, therefore, made to ascertain if this were so, but the results suggested that this was not the case. Nor did variations in time of

cooling after boiling appear to affect the result in any way.

Differences Due to Aeration.

Another curious feature about the Le Chatelier test was that instances were very frequently met with in which the expansion was considerably greater after six days' aeration of the sample than when first received or after only twenty-four hours' aeration. From the point of view of a test for soundness this was an obvious absurdity, since it was a well-known and thoroughly acknowledged fact that cement improved with aeration as regards soundness; it therefore very strongly suggested that the increased expansion of such samples upon boiling was due to causes altogether outside the question of soundness as it was generally understood, *i.e.*, the presence of disruptive agencies within the cement itself, which would eventually cause expansion under ordinary working conditions.

Less Expansion on Boiling than in Cold Water.

In a paper read before the Concrete Institute in May last on the setting properties, etc., of Portland cement Mr. H. K. G. Bamber referred at considerable length to the Le Chatelier boiling test, and raised one or two very interesting points. He first of all drew attention to the fact that the expansion of the specimen during the preliminary twenty-four hours' immersion in cold water was altogether ignored, only the subsequent expansion during boiling being taken into account, and pointed out that instances frequently occurred in which the expansion in cold water was considerable, whereas that resulting on boiling was negligible. The author of the present paper said he could fully bear out that statement, for it was the custom in his testing-room to record in every case the expansion caused by previous immersion in cold water as well as after boiling, and in many cases, more especially with slow-setting cement, the expansion in cold water was very much more serious than that due to boiling.

Surely it was more important to record the expansion under actual working conditions in cold water than that produced by boiling, for whatever the value of boiling as an accelerated test for soundness cement was rarely, if ever, subjected to boiling water in practice.

Slowly Hardening Cements.

Mr. Bamber also referred to the somewhat arbitrary condition of only allowing the cement twenty-four hours to harden under water before being subjected to the boiling water and suggested that failure was frequently due to the cement, more especially the slowly hardening varieties, not having had time to sufficiently harden in that brief period to withstand boiling water.

Expansion of Coarse Particles.

Referring once more to Mr. Bamber's paper, he gave as one reason of cement sometimes failing to pass the Le Chatelier test the inability of the coarse particles, or unpulverised clinker, to withstand boiling water without expansion, and expressed the opinion that "it has yet to be proved" that because such unpulverised material caused expansion when submitted to boiling water that it would also cause expansion under ordinary working conditions in cold water. With this the author quite agreed, and quoted experiments which showed that there was something in the contention.

Author's Conclusions.

The experiments embodied in the paper, taken as a whole, appeared, the author suggested, to justify his remark at the commencement, that where the condemnation of a cement for unsoundness was concerned the results given by the Le Chatelier boiling test should not be too rigidly interpreted. Apart from the mass of anomalies and conflicting results continually met with it was quite an open question whether a cement should be condemned as unsound because it would not withstand boiling water twenty-four hours after gauging, whether that twenty-four hours' preliminary hardening was in cold water or in air.

Whatever excellent reasons there might be for or against accelerated tests the author could vouch from personal experience for the fact that considerably less than twenty years ago not 10 per cent. of the Portland cement manufactured in England or elsewhere would withstand boiling water under the foregoing conditions; the obvious inference, therefore, was that if such was a true test for soundness 90 per cent. of the cement used twenty years age was unsound. This, in view of the hundreds of thousands of tons then used for important engineering work throughout the world, was rather a startling proposition; and, having regard to the excellent condition of such work at the present time, was one that could scarcely be seriously maintained.

On the motion of the Chairman a hearty vote of thanks was accorded to the author.

As to the author's conclusions, the Chairman said Mr. Butler appeared to suppose that because certain nations had failed to prepare cement of the admirable quality we had here that we should put the clock back twenty years. He thoroughly disagreed with him.

Mr. H. K. G. Bamber said the Faija test, good as it was, had become somewhat out of date because the cement manufacturer knew that if his cement failed to pass that test it must be very bad indeed. He had looked upon the Deval test as one of the most important tests that the manufacturer had had at his command. A test the author had omitted was the boiled balls test, but that was not in vogue now, he was glad to say. His experience of the Chatelier test was to the effect that where questions had arisen between the manufacturers and experts as to slight variations that when the manufacturer had had an opportunity of discussing the matter with the engineer and the expert in almost all cases the engineer, knowing the severity of the test, was willing to waive any very distinct line in connexion with reception or rejection. He believed that the test was generally accepted by cement manufacturers, and was of great value to them. Whatever the views of the engineer as to the severity of the test recommended by Mr. Butler, he must come to the conclusion in purchasing his cement that it was better for him to have a cement that would pass a severe test than one that would not. Like the Chairman, he should be sorry to see the clock put back.

The discussion was continued by Mr. Cooper and others, and the author replied.

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of the London County Council was held at the County Hall, Spring-gardens, S.W., on Tuesday, Mr. Whitaker Thompson, the Chairman, presiding.

Loans.—Sanction was given to the following:—The Fulham Metropolitan Borough Council 3,868*l.* for boilers in connexion with the Borough Council's electricity undertaking; the Lambeth Metropolitan Borough Council 371*l.* for paving and 2,900*l.* for street improvements; the Lewisham Metropolitan Borough Council 10,948*l.* for paving; the Poplar Metropolitan Borough Council 1,766*l.* for electric lighting; the Woolwich Metropolitan Borough Council 4,529*l.* for the extension of electric lighting mains.

Schools.—The Education Committee recommended that notice be given of the Council's intention:—

(i.) To provide additional public elementary school accommodation for about 1,800 children in Hoxton.

(ii.) To provide additional public elementary school accommodation for about 900 children in Hackney, S.

(iii.) To provide additional public elementary school accommodation for about 400 children in Haggerston and Bethnal Green, S.W.

(iv.) To provide a new public elementary school for about 1,500 children in Whitechapel.

(v.) To provide additional public elementary school accommodation for about 400 children by the enlargement of Fairclough-street school (St. George-in-the-East).

(vi.) To provide additional public elementary school accommodation for about 1,000 children in Stepney.

(vii.) To provide a new public elementary school for about 800 children in Bow and Bromley.

(viii.) To provide additional public elementary school accommodation for about 400 children in Poplar.

(ix.) To provide additional public elementary school accommodation for about 150 children in Limehouse.

Proposed Tramway Shelters.—It was recommended that the seal of the Council should be affixed to a petition for leave to insert an additional provision in the London County Council (Tramways and Improvements) Bill, 1910, to enable the Council to erect weather shelters in connexion with its tramways, subject to the consent of the road authority concerned, and also to construct public conveniences, street refuges, and similar works on the Victoria-embankment.

Knackers' Premises.—Amended plans were submitted showing the proposed enlargement of the knacker's premises of Messrs. Harrison, Barber, & Co., Ltd., in Blackwall-lane, Greenwich.

Alterations to Theatres, etc.—The Theatres and Music-halls Committee recommended that the following alterations be sanctioned:—

Holland Park Skating Rink, Holland Park-avenue, formation of a window to the store-room at the back of the band-room in the balcony.

Kennington Theatre, Kennington Park-road, installation of new motor generators and re-arrangement of the electrical connexions.

Olympia, Hammersmith, erection of cottages for the Ideal Home Exhibition.

Vaudeville Theatre, Strand, installation of hot-water radiators.

Camberwell Public Baths, Church-street, alterations.

A drawing, submitted by Messrs. F. Matcham & Co., showing a proposal to re-arrange the seating in the stalls at the New Grand Theatre of Varieties, St. John's-hill, Clapham Junction, and to form a new exit from the stalls to lead into Severus-road.

Drawings and a specification, submitted by Messrs. Greenaway & Newberry, of St. Mark's Parish Hall, proposed to be erected in Clarendon-road, Lewisham.

Drawings, submitted by Mr. F. White, showing the arrangements of buildings Nos. 12, 13, 21, 23, 24, 26, 47, 48, and 49 at the White City Exhibition, Shepherd's Bush, in connexion with the Japan-British Exhibition.

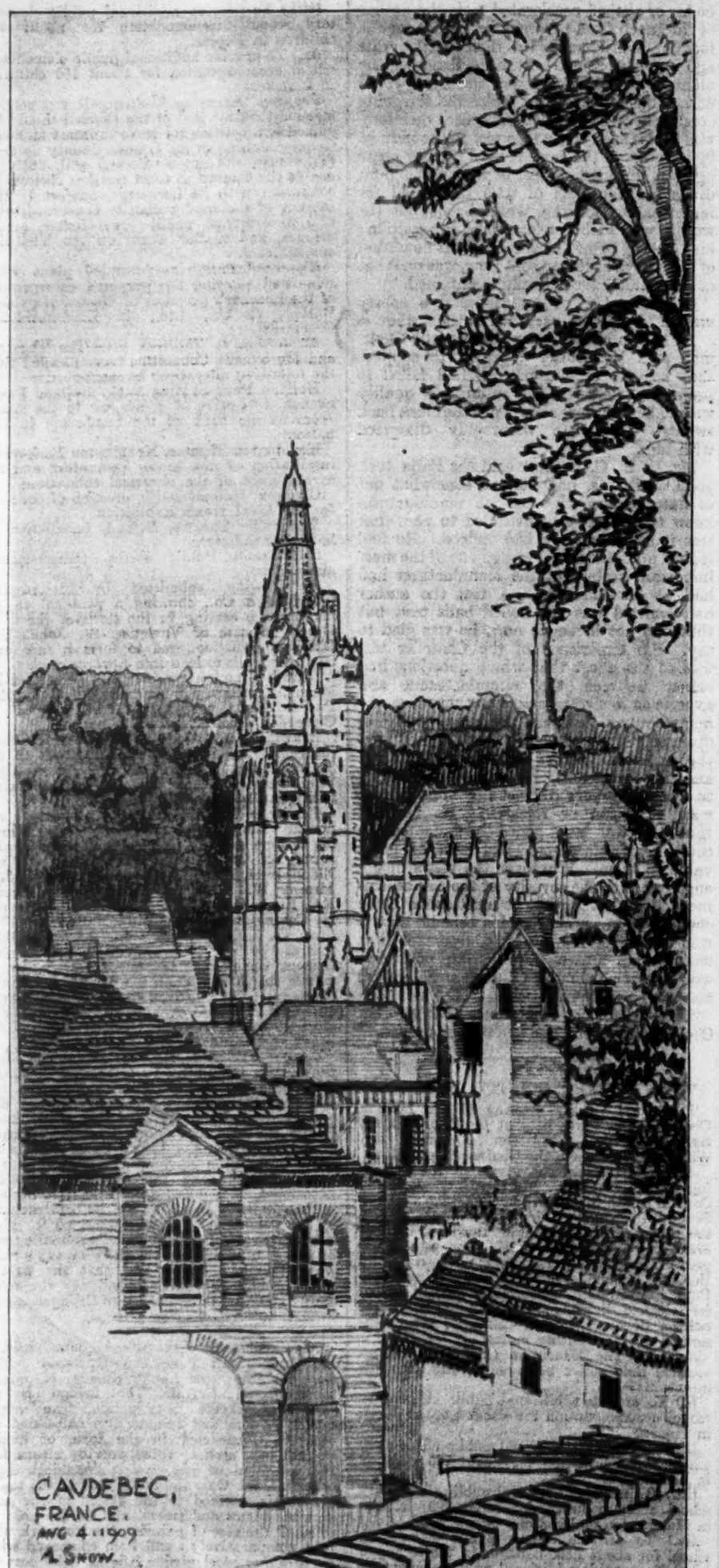
Tenders.—The Highways Committee reported the acceptance of the following tenders received from selected firms for the supply of ballast:—Messrs. Mossop & Co., Eldon-street, E.C (items A and B), 1,062*l.* 10s.; Messrs. W. R. Cunis, Ltd., Byward-street, E.C. (items C. and D), 1,366*l.* 13s. 4d.; Messrs. H. Covington & Sons, Ltd., Battersea, S.W. (item E), 250*l.* For the supply of about 3,300 tons of Portland cement, West Kent Portland Cement Company, Ltd., amounting approximately to 2,900*l.* For the supply of sand, Messrs. J. Shellbourne & Co., Fenchurch-street, E.C. (items A and B), 279*l.* 3s. 4d.; Messrs. Samuel West, Ltd., Trinity-square, E.C. (items C, D, and E), 379*l.* 3s. 4d.

Gray's Inn-road Improvement.—The Improvements Committee reported that they had considered the arrangements to be made for effecting the improvement consisting of the construction of the proposed new street from Gray's Inn-road to Pentonville-road by means of a bridge over the King's Cross Station of the Metropolitan Railway Company, and recommended, among other things, that an agreement be entered into with the Metropolitan Railway Company for the construction, by the company, of a new street 60 ft. wide between Gray's Inn-road and Pentonville-road by means of a bridge over the company's railway at King's Cross, and that the agreement provide that the Council pay the company 33,500*l.* on the exchange of the agreement.

NEW BRIDGE, CARDIFF.—A new bridge has been built over the Rhymney Railway at the eastern extremity of Monthermer-road, Cardiff. The bridge is of semi-ferro-concrete construction. The main lattice girders and bracing are embedded in concrete constructed in the form of longitudinal jack arches, which provide means for the provision of gas, water, electrical, and other mains. Only the under side of the main girders is exposed to the action of the sulphurous fumes and steam, and as the area is so small the cost of painting the ironwork will be a comparatively small item compared with an ordinary steel girder bridge. The cost of the bridge was from 2,300*l.* to 2,350*l.* Mr. Harpur, the Cardiff Borough Engineer, was responsible for the plans.

CAUDEBEC.

THIS view is taken from one of the thickly-wooded hills that surround Caudebec on all sides but one, it being bounded on that one by the river. Seen from all of these hills, the town is dominated by the remarkable church and its celebrated spire, and the beautiful picture made by the hills, the spire, and the river are well known by the pictures of the many artists who flock there, not only for general views, but for the many picturesque streets of half-timbered houses, the completeness of which makes the town almost unique.



Legal Column.

WORKMEN'S COMPENSATION.

THE case of Hughes *v.* Clover, Clayton & Co., which we discussed at some length (the *Builder*, July 31 last), has been carried to the House of Lords, where the decision has been affirmed by a majority of three to two. The decision is of very great importance, as it carries the finding of what is "an accident" under the Workmen's Compensation Act further than has been the case before. The applicant, employed by shipbuilders, was, in the ordinary course of his employment, tightening a nut with a spanner when he dropped dead. The medical evidence showed that he was suffering from an aneurism of the aorta in such an advanced condition that he might well have died even in his sleep, yet, his death occurring whilst he was at work, the majority of the House of Lords have held his death to have occurred by accident, and his employers to be liable in compensation. This being the final tribunal of Appeal, the decision admits of no question, and both employers and employed must accept it, but it cannot be denied that it renders employers open to serious liabilities which were certainly not within their contemplation when the Act was passed. In our former note we also pointed out that it rendered it more difficult for workmen suffering from any infirmity to obtain employment, and Lord Shaw of Dumfermline, who dissented from the judgment, endorses this view, for he says, "Should such persons be held to carry with them into and upon employment the serious additional liability referred to, employment may become for such persons—often the most needy and deserving of the population—more difficult to obtain." We venture to agree with Lord Shaw that the Courts do not render a service to the working population by stretching the language of such Acts, and that decisions upon decisions tend to lead very far away from the meaning of the statute. All that remains to be said about the present case, which goes further than any former decision, is that the Lord Chancellor, though upholding the judgment, indicated that he himself, had he been sitting as arbitrator, would very likely have come to a different conclusion, but as there was evidence to support the findings, he could not disturb them. The unfortunate thing about such judgments is that arbitrators, looking to the final Court of Appeal for guidance, are apt to follow the decisions in all cases of a similar nature, and thus the scope of the Act becomes insensibly enlarged.

DISCHARGING SEWAGE INTO THE THAMES.

A Divisional Court has recently given an important decision in the case of Thames Conservators *v.* Gravesend Corporation (current "Law Reports") upon sect. 94 of the Thames Conservancy Act, 1894, which renders it an offence to cause or suffer any sewage to flow into the Thames, "even although such sewage had been so caused or suffered to flow before the passing of this Act." By virtue of the Public Health Act, 1872, the Borough became the sanitary authority for the district. The general drainage of Gravesend was by cesspools, but about a hundred years ago a surface water drain was carried down the High-street, and certain houses and some of the Corporation buildings were connected with it, and sewage was carried down it and was discharged into the river. The justices found that there was either a prescriptive right

or a statutory right under sect. 21 of the Public Act, 1875, to drain into the sewer, and that as the sanitary authority could not prevent it until they had provided an effective alternative system, they did not "cause or suffer" the discharge into the Thames within the meaning of the section. The Conservators appealed, and the Divisional Court, as far as related to the sewage from private houses, affirmed the decision of the justices, feeling bound to do so by a decision delivered in 1888, Reg. *v.* Staines Local Board, in which it was held that a local authority who have not themselves constructed the sewers, but have only permitted them to be used by inhabitants who have acquired a prescriptive right, cannot be convicted of "having caused or suffered" sewage to flow into the Thames. On this part of the case it may be pointed out that the Lord Chief Justice, though accepting this decision in the above case as binding upon the Court, expressed some dissatisfaction with it. The statute in that case also did not contain the provision "even though such sewage had been lawfully caused or suffered to flow before the passing of this Act," but this did not serve to distinguish the case, because according to that decision the sanitary authority do not "cause or suffer" the offence to be committed at all. There was, however, a second branch to the case, and on this point the Divisional Court reversed the finding of the justices, and decided against the Corporation. The Corporation, in 1893 and onwards, in their capacity as municipal Corporation, had altered the municipal buildings and market hall, and had allowed the drainage from conveniences to pass into this sewer, and in respect of this discharge by themselves they were held to have committed an offence under the statute.

Water for Domestic Purposes.

A Divisional Court in the case Metropolitan Water Board *v.* London, Brighton, South Coast Railway, Ltd., has had to consider the vexed question once again of the meaning of "a supply of water for domestic purposes" under the Metropolitan Water Board (Charges) Act, 1907. The water in this case was supplied to the public urinals and lavatories at West Norwood Station, and the Water Board contended this to be a supply for domestic purposes for which, under sect. 8, a rate of 5 per cent. on the rateable value of the premises was payable, whilst the railway company contended that under sect. 25 it was a "railway purpose," for which they were entitled to pay by meter under sect. 16. It has been decided in cases under the Waterworks Clauses Act, 1847, that the question to be determined is whether the actual use the water is put to is a "domestic purpose," whether on business premises or otherwise. See Barnard Castle Urban District Council *v.* Wilson (the *Builder*, July 26, 1902), South-West Suburban Water Company *v.* St. Marylebone Union (the *Builder*, June 18, 1904). In the recent case South Suburban Gas Company *v.* Metropolitan Water Board (noted the *Builder*, October 23), a judge of the Chancery Division applied the principle of these cases to the Metropolitan Water Board Act, and made a declaration that the water supplied to the lavatories and conveniences used by the employees of the Gas Company on premises where no one resided, was not a supply under sect. 16 for non-domestic purposes. The Divisional Court in the case under review has somewhat questioned this decision, and indicated it went to the very verge of the law. The judges expressed the view that some degree of occupation or residence of the premises on the part of persons using the conveniences was necessary, and that, taken in conjunction with the words "railway purposes," this element was absent in the present case, and the company were entitled to a supply by meter. It seems unfortunate that statutes which apply to monopolies and the supply of one of the chief necessities of life should be passed in terms which lead to so much litigation and uncertainty.

Landlord *v.* Tenant.

One of the commonest covenants to be inserted in leases is that which provides that the lease shall not be assigned without obtaining the previous licence in writing of the lessors, which licence or consent shall not unreasonably or arbitrarily be withheld. In the *Builder* for August 24, 1907, and April 18, 1898, we referred to two cases where a fine or sum of money was demanded as consideration for consenting to assignment, in which case, in the absence of very express terms in the lease itself, the Conveyancing Act, 1892, renders such a condition illegal, but the recent case, Evans *v.* Levy, affords an example of what the courts will deem an unreasonable condition apart from this statute or any question of fine or money payment. The plaintiff was the assignee of a leasehold house demised in 1901, and he wished to assign his interest in the lease to his wife. The lessors objected to the assignment to a married woman, and declined to give their consent unless the husband bound himself by deed to pay the rent and perform the obligations under the head lease. The court held this to be unreasonable, and granted a declaratory order that the plaintiff was entitled to assign the lease without further consent, following the decision of the Court of Appeal in Young *v.* Ashley Gardens Properties, Ltd. (the *Builder*, July 11, 1903). The important point for lessors to remember is that if they impose an unreasonable condition then their consent may be dispensed with altogether.

A Case of Nuisance on a Highway.

The case of Robinson *v.* London General Omnibus Company recently brought in the Chancery Division raised a question of some importance to owners of house property. At the time the action was commenced the omnibus company ran a line of omnibuses down to Leyton, and the owners and the weekly tenants of certain houses in Capworth-street and Bromley-road brought the action for an injunction stating that the company used these streets for shunting, turning, and repairing purposes, and caused a nuisance. The line of omnibuses had been suspended in August, 1909, but the action proceeded, the question remaining to be decided whether the action had originally been properly brought, as there was the payment of costs to be considered. The judge found that there had been excessive use of these streets amounting to a nuisance, as they had been used by the defendants as a stand, their nearest depôt being some distance away, but it is important to observe that the allegation on the part of some of the plaintiffs that the omnibuses had caused structural damage to the houses by vibration failed altogether, and in so far as the costs had been increased by supporting that contention, they were disallowed the plaintiffs and given to the defendants.

Competition News.

The National Museum of Wales.

The Council of the National Museum of Wales has appointed as architects of the new museum buildings Messrs. A. Dunbar Smith & Cecil C. Brewer, 2, Gray's Inn-square, W.C., and has further awarded the following premiums:—200*l.* to Mr. T. L. Vesper, 16, Old-square, Lincoln's-inn, W.C.; 150*l.* to Mr. Henry T. Hare, 13, Hart-street, Bloomsbury-square, W.C.; 100*l.* to Messrs. David Milne & J. William Hepburn, 55, Southampton-row, W.C.

Scottish Exhibition Poster Competition.

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R. PHENÉ SPIERS.

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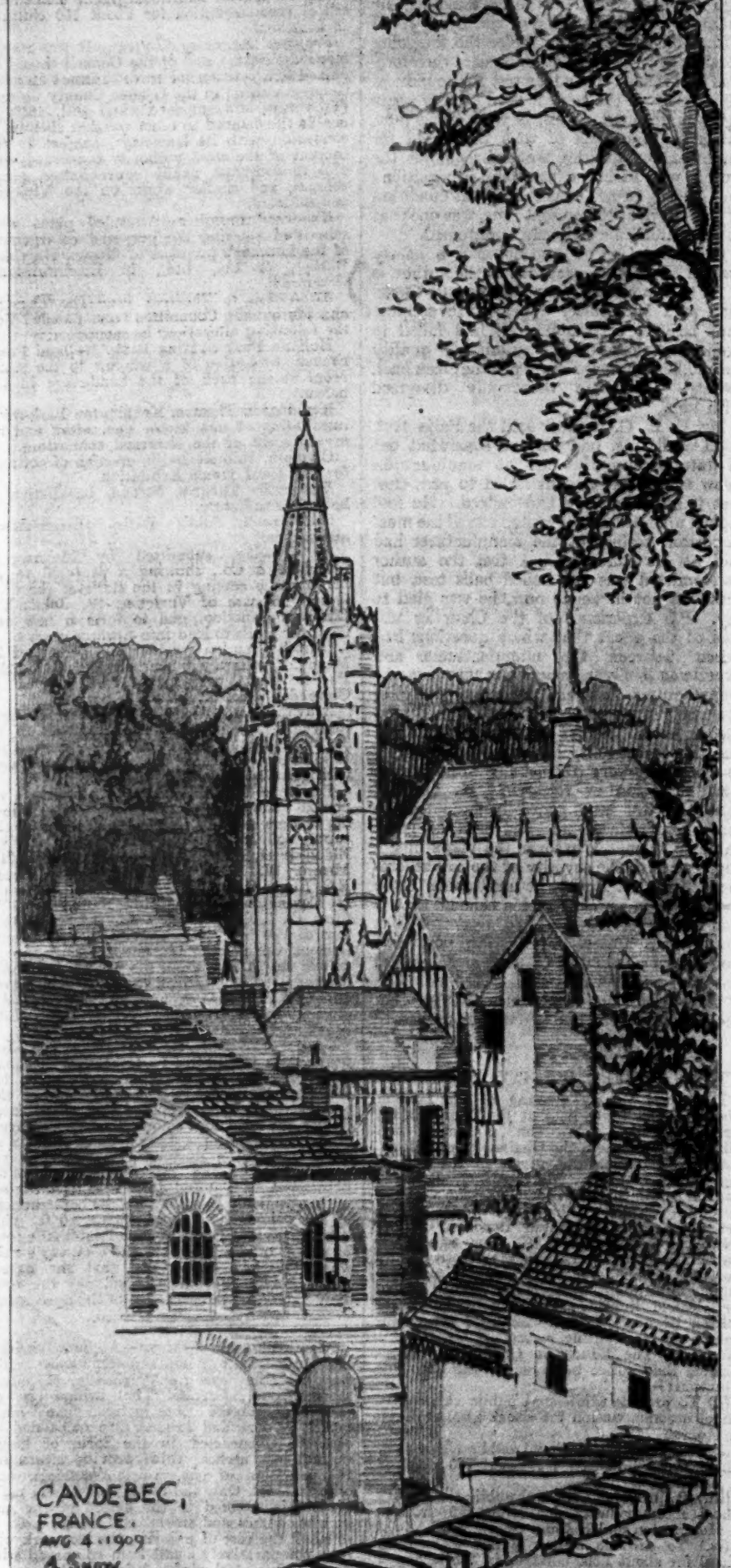
CAUDEBEC.

THIS view is taken from one of the thickly-wooded hills that surround Caudebec on all sides but one, it being bounded on that one by the river. Seen from all of these hills, the town is dominated by the remarkable church and its celebrated spire, and the beautiful picture made by the hills, the spire, and the river are well known by the pictures of the many artists who flock there, not only for general views, but for the many picturesque streets of half-timbered houses, the completeness of which makes the town almost unique.



Legal Column.

WORKMEN'S COMPENSATION.

THE case of Hughes *v.* Clover, Clayton & Co., which we discussed at some length (the *Builder*, July 31 last), has been carried to the House of Lords, where the decision has been affirmed by a majority of three to two. The decision is of very great importance, as it carries the finding of what is "an accident" under the Workmen's Compensation Act further than has been the case before. The applicant, employed by shipbuilders, was, in the ordinary course of his employment, tightening a nut with a spanner when he dropped dead. The medical evidence showed that he was suffering from an aneurism of the aorta in such an advanced condition that he might well have died even in his sleep, yet, his death occurring whilst he was at work, the majority of the House of Lords have held his death to have occurred by accident, and his employers to be liable in compensation. This being the final tribunal of Appeal, the decision admits of no question, and both employers and employed must accept it, but it cannot be denied that it renders employers open to serious liabilities which were certainly not within their contemplation when the Act was passed. In our former note we also pointed out that it rendered it more difficult for workmen suffering from any infirmity to obtain employment, and Lord Shaw of Dumfermline, who dissented from the judgment, endorses this view, for he says, "Should such persons be held to carry with them into and upon employment the serious additional liability referred to, employment may become for such persons—often the most needy and deserving of the population—more difficult to obtain." We venture to agree with Lord Shaw that the Courts do not render a service to the working population by stretching the language of such Acts, and that decisions upon decisions tend to lead very far away from the meaning of the statute. All that remains to be said about the present case, which goes further than any former decision, is that the Lord Chancellor, though upholding the judgment, indicated that he himself, had he been sitting as arbitrator, would very likely have come to a different conclusion, but as there was evidence to support the findings, he could not disturb them. The unfortunate thing about such judgments is that arbitrators, looking to the final Court of Appeal for guidance, are apt to follow the decisions in all cases of a similar nature, and thus the scope of the Act becomes insensibly enlarged.

DISCHARGING SEWAGE INTO THE THAMES.

A Divisional Court has recently given an important decision in the case of Thames Conservators *v.* Gravesend Corporation (current "Law Reports") upon sect. 94 of the Thames Conservancy Act, 1894, which renders it an offence to cause or suffer any sewage to flow into the Thames, "even although such sewage had been so caused or suffered to flow before the passing of this Act." By virtue of the Public Health Act, 1872, the Borough became the sanitary authority for the district. The general drainage of Gravesend was by cesspools, but about a hundred years ago a surface water drain was carried down the High-street, and certain houses and some of the Corporation buildings were connected with it, and sewage was carried down it and was discharged into the river. The justices found that there was either a prescriptive right

or a statutory right under sect. 21 of the Public Act, 1875, to drain into the sewer, and that as the sanitary authority could not prevent it until they had provided an effective alternative system, they did not "cause or suffer" the discharge into the Thames within the meaning of the section. The Conservators appealed, and the Divisional Court, as far as related to the sewage from private houses, affirmed the decision of the justices, feeling bound to do so by a decision delivered in 1888, Reg. *v.* Staines Local Board, in which it was held that a local authority who have not themselves constructed the sewers, but have only permitted them to be used by inhabitants who have acquired a prescriptive right, cannot be convicted of "having caused or suffered" sewage to flow into the Thames. On this part of the case it may be pointed out that the Lord Chief Justice, though accepting this decision in the above case as binding upon the Court, expressed some dissatisfaction with it. The statute in that case also did not contain the provision "even though such sewage had been lawfully caused or suffered to flow before the passing of this Act," but this did not serve to distinguish the case, because according to that decision the sanitary authority do not "cause or suffer" the offence to be committed at all. There was, however, a second branch to the case, and on this point the Divisional Court reversed the finding of the justices, and decided against the Corporation. The Corporation, in 1893 and onwards, in their capacity as municipal Corporation, had altered the municipal buildings and market hall, and had allowed the drainage from conveniences to pass into this sewer, and in respect of this discharge by themselves they were held to have committed an offence under the statute.

Water for Domestic Purposes.

A Divisional Court in the case Metropolitan Water Board *v.* London, Brighton, South Coast Railway, Ltd., has had to consider the vexed question once again of the meaning of "a supply of water for domestic purposes" under the Metropolitan Water Board (Charges) Act, 1907. The water in this case was supplied to the public urinals and lavatories at West Norwood Station, and the Water Board contended this to be a supply for domestic purposes for which, under sect. 8, a rate of 5 per cent. on the rateable value of the premises was payable, whilst the railway company contended that under sect. 25 it was a "railway purpose," for which they were entitled to pay by meter under sect. 16. It has been decided in cases under the Waterworks Clauses Act, 1847, that the question to be determined is whether the actual use the water is put to is a "domestic purpose," whether on business premises or otherwise. See Barnard Castle Urban District Council *v.* Wilson (the *Builder*, July 26, 1902), South-West Suburban Water Company *v.* St. Marylebone Union (the *Builder*, June 18, 1904). In the recent case South Suburban Gas Company *v.* Metropolitan Water Board (noted the *Builder*, October 23), a judge of the Chancery Division applied the principle of these cases to the Metropolitan Water Board Act, and made a declaration that the water supplied to the lavatories and conveniences used by the employees of the Gas Company on premises where no one resided, was not a supply under sect. 16 for non-domestic purposes. The Divisional Court in the case under review has somewhat questioned this decision, and indicated it went to the very verge of the law. The judges expressed the view that some degree of occupation or residence of the premises on the part of persons using the conveniences was necessary, and that, taken in conjunction with the words "railway purposes," this element was absent in the present case, and the company were entitled to a supply by meter. It seems unfortunate that statutes which apply to monopolies and the supply of one of the chief necessities of life should be passed in terms which lead to so much litigation and uncertainty.

Landlord *v.* Tenant.

One of the commonest covenants to be inserted in leases is that which provides that the lease shall not be assigned without obtaining the previous licence in writing of the lessors, which licence or consent shall not unreasonably or arbitrarily be withheld. In the *Builder* for August 24, 1907, and April 18, 1898, we referred to two cases where a fine or sum of money was demanded as consideration for consenting to assignment, in which case, in the absence of very express terms in the lease itself, the Conveyancing Act, 1892, renders such a condition illegal, but the recent case, Evans *v.* Levy, affords an example of what the courts will deem an unreasonable condition apart from this statute or any question of fine or money payment. The plaintiff was the assignee of a leasehold house demised in 1901, and he wished to assign his interest in the lease to his wife. The lessors objected to the assignment to a married woman, and declined to give their consent unless the husband bound himself by deed to pay the rent and perform the obligations under the head lease. The court held this to be unreasonable, and granted a declaratory order that the plaintiff was entitled to assign the lease without further consent, following the decision of the Court of Appeal in Young *v.* Ashley Gardens Properties, Ltd. (the *Builder*, July 11, 1903). The important point for lessors to remember is that if they impose an unreasonable condition then their consent may be dispensed with altogether.

A Case of Nuisance on a Highway.

The case of Robinson *v.* London General Omnibus Company recently brought in the Chancery Division raised a question of some importance to owners of house property. At the time the action was commenced the omnibus company ran a line of omnibuses down to Leyton, and the owners and the weekly tenants of certain houses in Capworth-street and Bromley-road brought the action for an injunction stating that the company used these streets for shunting, turning, and repairing purposes, and caused a nuisance. The line of omnibuses had been suspended in August, 1909, but the action proceeded, the question remaining to be decided whether the action had originally been properly brought, as there was the payment of costs to be considered. The judge found that there had been excessive use of these streets amounting to a nuisance, as they had been used by the defendants as a stand, their nearest depôt being some distance away, but it is important to observe that the allegation on the part of some of the plaintiffs that the omnibuses had caused structural damage to the houses by vibration failed altogether, and in so far as the costs had been increased by supporting that contention, they were disallowed the plaintiffs and given to the defendants.

Competition News.

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East Barnet.—Plans have been passed for Mr. J. T. Champ for twelve houses in Capel-road.

Hendon.—The Rural District Council have passed plans as follows:—Mr. D. Jones, four houses, Beresford-road; alterations and additions to Sidbury Lodge, Edgware-road, for Messrs. J. C. Tenant & Co. Mr. H. Goslett had lodged plans for a golf club-house at Grimes Dyke, Oxhey-lane.

Lambeth.—222*l.* is to be spent in repairs to the footway in Tinworth-street.

Poplar.—Subject to various consents being obtained, a shelter and disinfecting-house is to be erected in Glaucus-street, at an estimated cost of 1,260*l.*

Stepney.—Plans have been passed for Messrs. Dolley & Altman for a building on the west side of Brick-lane, Whitechapel.

Watford.—The Urban District Council has passed the following plans:—Three houses, Sandringham-road, for Mr. J. W. Dudley; additions to church hall, Mildred-avenue, for the Rev. W. H. Littlebury; four houses, Princes-avenue, for Mr. D. Eames; three houses, Cassiobury Park-avenue, for Messrs. C. Brightman & Son.

WESTMINSTER CITY COUNCIL.

At the fortnightly sitting of the Westminster City Council on Thursday last week, the following matters were dealt with:—

District Surveyors' Charges.—It was agreed to support the action of the Southwark Borough Council in approaching the London County Council pointing out that time had arrived when there should be a readjustment of the charges made by District Surveyors.

Height of Footway Kerbs.—With a view to the prevention of accidents from motor-cars mounting the footways in London, the Commissioner of Police had suggested that when footways of main roads were under repair the Council might consider the desirability of having the level of the kerbs raised.—It was agreed to inform the Commissioner that the suggestion would have careful consideration.

Paving Contracts.—On December 9 the Council decided to make a claim on the Improved Wood Pavement Company in regard to the refusal of the company to repave the entire surface of St. James's-street with new wood blocks. Before the claim was made the company wrote denying that they had failed to carry out the contract, as they had properly maintained the roadway during two successive periods of fifteen years in accordance with their contracts. The Council were advised that there was a breach of contract, and therefore had given instructions for a claim to be prepared and served on the company.

New Street.—A letter and plan had been received from Messrs. Drivers, Jones, & Co. for consent to an amendment of the method of constructing the new street to be formed from Princes-street along the north and west sides of the Wesleyan Methodist hall to Tothill-street.—It was agreed to acceed to the application subject to certain conditions.

The Mall.—A plan had been submitted by Sir H. Tanner, on behalf of H.M. Office of Works, showing levels of the proposed new road into Charing Cross. In considering the cost of the suggested street works (apart from the acquisition of property) the City Engineer had dealt with certain modifications of the Government proposals, and the Improvements Committee thought the best course to adopt would be for the City Council to pave Spring-gardens (from existing wood at north end to the north side of Drummond's Bank) and lower the paving so as to suit the altered levels due to the new Mall, leaving the further widening of the short connecting street to be dealt with afterwards, and to pave the connecting street to the extent only of the land at present vacant. The cost of the work is estimated to be 1,613*l.*, and the Engineer was instructed to carry out the work.

PROJECTED NEW BUILDINGS IN THE PROVINCES.

BARGOED.—Stores, depôt, and mortuary; Surveyor, Gelligaer Urban District Council.

Barking.—Proposed Faircross School; Surveyor, Urban District Council. The Urban District Council has passed the following plans:—Rink, Wakering-road, for Mr. A. Blake; six houses, Ripple-road, for Mr. W. Corbett Mighell; four shops, Ripple-road, for Mr. G. A. Smith; block of offices, Creeksmouth, for the British Coalite Company, Ltd.; proposed cinematograph theatre, Ripple-road, for Mr. A. E. Martin.

Barrow.—Ten houses, Roose-road; Mr. W. Yates, builder.

Benwell. — Parish hall, Atkinson-road (2,500*l.*); Mr. C. S. Errington, architect, Victoria-buildings, Grainger-street, Newcastle-on-Tyne.

Bolton.—Engine-house, Cricket-street; Mr. J. Ormrod, Hardcastle.

Branton—School (2,000*l.*); Mr. J. Forrest, architect, Moot Hall, Newcastle.

Briton Ferry.—Boys' and infants' schools; Mr. I. Nash, architect, Angel-street, Neath.

Cambois (Northumberland). — Institute (2,500*l.*); Mr. Golden, Blyth, Northumberland.

Cannesbury. — Golf clubhouse (1,500*l.*); Messrs. Walker & Ramsay, 123, Wellington-street, Glasgow.

Chester.—School, Victoria-road (3,000*l.*); Mr. T. Mayers, builder, Rowton.

Chopwell.—Co-operative premises (3,000*l.*); Mr. G. T. Wilson, architect, 22, Durham-road, Blackhill.

Colwyn Bay—Block of shops; Mr. R. Jones, Liverpool House, Colwyn Bay.

Darlington.—Additions, workhouse (3,500*l.*): Messrs. Pallister & Son, Crook, Durham.

Dorchester.—St. Mary's Church (20,000*l.*); Mr. C. E. Ponting, architect, Marbro', Wilts; Messrs. Hasting & Son, builders, Victoria-park, Dorchester.

Dumbarton.—Additions to works of Messrs. Wm. Denny & Son, ship builders (6,000*l.*); plans by firm's own staff.

Dunfermline.—Workshops and offices, Woodhead-street (3,000*l.*); Messrs. Normand & Thomson, 21, Queen Anne-street, Dunfermline.

Edinburgh.—Coach works, McDonald-road (2,750*l.*); architect, P. R. McLean, 24, St. Andrew-square, Edinburgh. Cox's factory, Gorgie Mills (2,500*l.*); Messrs. G. Beattie & Son, architects, 136, George-street, Edinburgh.

Exeter.—St. Luke's College (5,000*l.*); Messrs. G. Setter & Son, builders, Exeter.

Gateshead.—School (4,000*l.*); Mr. F. W. Purser, builder, West-street, Gateshead.

Glasgow.—Hall buildings, for Ruchill U.F. Church (1,400*l.*); Mr. N. C. Duff, architect, 115, Wellington-street, Glasgow.

Goodwick.—School (6,500*l.*); Mr. W. J. Thomas, architect, 17, Victoria-place, Haverfordwest.

Guisborough. — Extensions, workhouse (2,000*l.*); Mr. W. Wardman, Redcar.

Hinton (Glos.).—School (3,000*l.*); Mr. R. S. Phillips, architect, The Cross, Glos.; Messrs. Walters & Sons, builders, Bristol.

Hornsea.—Sixteen houses, Grosvenor-terrace; Mr. Leith.

Inverness. — Stores, Dempster-gardens (3,000*l.*); Mr. A. F. McKenzie, 15, Union-street, Inverness.

Irvine.—Electric power-station for Messrs. Matthew, Wright, & Nephew, Harbour-street (1,200*l.*); plans by firm's own staff.

Liverpool.—Works, Pall Mall; Messrs. R. Owen & Sons, architects, Crosshall-street, Liverpool; Messrs. I. & J. Chappell, builders, Walton, Liverpool.

Llanelly.—Alterations to workhouse; the Guardians.

Manchester.—Extensions, Ear and Throat Hospital (1,000*l.*); Clerk to Board of Management.

Market Harborough.—Police-station (3,000*l.*); Mr. S. Perkins Pick, County Architect, Market Harborough.

Morley.—Extensions to fire-station; Surveyor.

Myrholmroys. — Engine-house (1,200*l.*); Messrs. Longbottom & Culpen, Halifax.

Nelson.—Schools, Nelson-lanes; Messrs. Davidson & Sons, architects, Newcastle; Mr. I. Thomas, builder, Ash Grove, Nelson.

Newcastle.—Children's institute (7,000*l.*); Messrs. Shewbrooks & Hodges, Grainger-street West, Newcastle. Mortuary (1,400*l.*); Mr. Steele, City Engineer, Newcastle.

New Lambton.—School; Mr. W. Rushworth, architect, Durham; Messrs. Cleary & Charlton, builders, Sunderland.

Old Cummock (Ayrshire).—Additions, school (2,000*l.*); Mr. W. Cowie, architect, Alloway-chambers, Ayr.

Port Dundas.—Enlargement of McLellan's oilworks (2,500*l.*); Messrs. F. Barnet & Boston, 180, Hope-street, Glasgow.

Portobello.—Golf clubhouse (1,200*l.*); Mr. I. A. Williamson, City Architect, Edinburgh.

Ribbleton.—Parish hall and school (4,000*l.*); Mr. H. D. Hartley, 7, Lund-street, Preston.

Seaforth.—Schools, Rawson-road; Messrs. Appleyard & Quiggin, architects, Lord-street, Liverpool; Messrs. Hall & Son, builders, Christian-street, Liverpool.

Seughenydd.—School; Mr. D. P. Jones, architect, Charles-street, Cardiff.

Sheffield.—Central stores; Sheffield and Eccleshall Co-operative Society, Ltd.

Southall. — Council school, Western-road (11,475*l.*); Messrs. Treasure & Son, builders, Cottenham-road, Holloway, N.

South Brent.—Church hall; the Vicar.

Southend.—The Town Council have passed the following plans:—Messrs. E. Edmunds, two houses in Leigh-road East; Messrs. Welbourn Brothers, seven houses, Central-avenue; Mr. D. E. Kerridge, two houses, Belle Vue-road; Mr. C. Wingrave, twelve houses, Moseley-street; Mr. W. Knight, three houses, Southview-drive; Mr. J. Annereau, two houses, Brightwell-avenue; Mr. F. Padley, seventeen houses, Hainault-avenue; Mr. J. C. Flaxman, three houses, Electric-avenue; Mr. F. Ramuz, twenty lock-up shops, Eastern-esplanade, and an entertainments hall, Royal-hill; Mr. H. L. Davis, Welcome Club, Station-road; Mr. C. R. Kibbey, five houses, Brightwell-avenue; Mr. P. G. Hugh, two houses, Gloucester-terrace; Mr. C. May, six houses and shops, Leigh-road West; Mr. A. S. Barley, flats, Whitefriars-crescent; Mr. W. Bray, two houses, St. Ann's-road; Mr. J. Catchpool, one house, Sea View-road; Mr. E. Preedy, two houses, Hildaville-drive; Mr. F. F. Ramuz, two houses and shops, Station-road, and house and shop, near Whitefriars-crescent; Mrs. Retzbach, a house, Cliff-gardens.

Spennymoor.—School; Mr. F. Hilton, builder, Bishop Auckland.

Staines.—Hospital (thirty-two beds); Mr. Manning, architect, care of Staines Joint Hospital Board.

Stoke-upon-Trent.—The Town Council has passed the following plans:—Proposed theatre and entertainment hall, Church-street, for the King's Hall Company, Birmingham; workshops, etc., North-street, for Messrs. Torrance & Sanders; four cottages, Garden Suburb, Trantham-road, Penkhull, for the Stoke-upon-Trent Tenants, Ltd.

Swansea.—The Town Council has passed the following plans:—Four houses, Eaton-road, Brynhyfryd, for Mr. W. Ingleson; lock-up shops, bakehouse, and stable, The Grove, Upland, for Mr. E. Jones; seventeen houses, Megan-street, Cwmdu, for Messrs. J. & F. Weaver; bioscope theatre, Woodfield-street, Morriston, for Mr. Wm. Coutts; premises, Union-street, and Park-street, for the National League of Young Liberals; three houses, Mayhill, for Messrs. Pepler & Allen; eight houses, Mayhill, for the Town Hill Building Club; service and reading room, etc., Mirador-crescent, for the Christian Science Society; addition to public hall, Llangyfelach-road, Treboeth, for the Trustees; four houses, Ernald-place, for Mr. A. J. Richards. The following plans have been lodged:—Three houses, Knoll-avenue, for Mr. E. L. Tucker; new road and six houses, Townhill, for the Garden Suburb Freehold Company, Ltd.

Uddingston.—Additions to Grammar School (2,000*l.*); Messrs. Bruce & Hay, architects, 261, West George-street, Glasgow.

Walsham.—Vicarage, parish church (3,100*l.*); Mr. Jas. Chadwick, architect, 10, Princess-street, Manchester.

Obituary.

MR. THOMAS.

The death is announced of Mr. George Thomas, F.S.I., of Queen's-chambers, Cardiff, and Barry. Mr. Thomas was elected a Fellow of the Royal Institute of British Architects in 1901, and was President, 1900-1, of the Cardiff, South Wales, and Monmouthshire Architects' Society. He was the architect of the school buildings in Romilly-road, Barry, for the Urban District School Board, and the Guildford-street Hall, Cardiff, for the Cardiff Masonic Hall Company (1895); the Girls' Intermediate School, Cardiff, and other school buildings for the Governors of the Cardiff Intermediate Schools (1897); the Conservative Club Company's clubhouse; the Hall, Barry; and schools for the Barry School Board, in Barry (1899); the Congregational church, and the Carmel New Welsh Wesleyan chapel (designed after the Gothic style), Barry Dock (1906).

General Building News.

SECONDARY SCHOOL, MEXBOROUGH.

A secondary school, erected and furnished at a cost approaching 20,000*l.*, has been opened by Mr. E. Talbot, Chairman of the West Riding Higher Education Committee. The institution, situate at Mexborough, is known as the Mexborough and District Secondary School. The accommodation provided is for 346 scholars. The ground floor comprises eight classrooms, all of which open into, or are adjacent to, an assembly hall, which has a platform at one end. The size of the hall is 78 ft. 9 in. by 34 ft., and the height 34 ft. 6 in. The library and girls' common-room (which will also be used as a committee-room) is 32 ft. 6 in. by 22 ft. 6 in., with bay window in addition. There is a cookery instruction-room for twenty scholars, with pantry and coal place; a laundry instruction-room for fifteen scholars, with drying-room; a scholars' dining-room, with kitchen, servery, and a cellar

larder. To the front are the scholars' entrances and cloakrooms, which contain separate lockers for each pupil. At the back of the site, and connected by a wider corridor, is the gymnasium 49 ft. by 24 ft. 6 in., with a gallery at one end, also changing-rooms and shower-baths for the scholars. There are three staircases leading up to the first floor. The first floor contains classrooms, lecture-room, etc. In the basement is the boys' manual instruction-room, etc. The staircases are of stone. Externally the front of the building is faced with Conisborough pressed bricks, and at the sides with pressed bricks. The facings are of local stone. Mr. G. H. Smith, of Mexborough, has carried out the contract for the builders' general work, and for the slater's, plasterer's, and painter's work, which have been executed under him respectively by the following subcontractors:—Slater, Mr. Charles Kemp, Swinton; plasterers, Messrs. Bendelow & Bennett, Mexborough; painter, Mr. W. Nicholson, Mexborough. Mr. Thomas Wade, of Wath-upon-Dearne, has carried out the carpenter's and joiner's work, and also had the contract for the plumber's work, which has been executed for him by Messrs. J. Snowden & Son, of Barnsley. The heating apparatus has been installed by Messrs. Wright Brothers, of Attercliffe, Sheffield. The electric lighting has been executed by Messrs. T. B. & W. Cockayne, Ltd., of Sheffield, to the specification and under the supervision of Mr. W. Cradock Knight. The special fittings to the science-rooms have been supplied by the North of England School Furnishing Company, Ltd., of Darlington; and the domestic science and manual rooms by Messrs. Illingworth, Ingham, & Co., Ltd., of Leeds. The clerk of the works has been Mr. A. Falding, of Mexborough. The architect is Mr. James E. Knight, of Rotherham.

SCHOOL, ELLESMERE PORT.

A new Council school, which is capable of accommodating 700 children, 350 infants and juniors on the ground floor, and 350 seniors (boys and girls) on the first floor, has just been opened at Ellesmere Port. The building is two storied, and is faced with Connah's Quay bricks, being erected by Messrs. Duthie & Dobson, of Liverpool, to plans prepared by Messrs. C. E. Deacon & Horsburgh, Liverpool. The contract for the main building was 7,337*l.*, for the handicraft, cooking, and laundry buildings 1,195*l.* The ground floor contains three classrooms 25 ft. by 25 ft., two other classrooms, and a large assembly-hall, 375 sq. ft. in extent. There are also storerooms and lavatories. The first floor is designed after the style of the ground floor. All the rooms of the school have wood-block floors, on concrete, and are fireproof. Caretaker's premises are fitted up in the basement. Detached buildings are provided as centres for handicraft, cookery, and laundry instruction for boys and girls attending the schools in the district.

ROTHERHAM GRAMMAR SCHOOL.

The Governors of the Rotherham Grammar School have made certain additions and alterations to their building in Moorgate. The accommodation has been extended from 150 to 225. The two old wings at the back of the Grammar School have been entirely done away with, and in their places a large assembly-hall has been erected, surrounded by classrooms and rooms for special work. The latter include chemical laboratory, physical laboratory, science lecture-room, large gymnasium, manual room for woodwork, art-rooms, etc. The work has been carried out by Messrs. James Fidler, Ltd., of Sheffield, under the supervision of Mr. J. E. Knight, as architect. The total cost of the whole scheme approaches 7,000*l.*

CHURCH HALL, PITLOCHRY.

A new hall is to be erected in connexion with Pitlochry Established Church from designs by Messrs. Leonard & Morris, architects. The building is to seat 200 persons, and there will be additional rooms for small meetings.

LIBRARY, NEW TREDEGAR.

The old Workmen's Hall, New Tredegar, has been reopened as a reading-room, library, and billiard-room. Mr. G. Kenshole, architect, Bargoed, was responsible for the plans for the alterations necessary. The heating arrangements—low-pressure hot-water system—were carried out by Messrs. Hampton & Sons, Cardiff. Messrs. Nodden & Lee, Bargoed, were the contractors.

RANGER'S BUNGALOW, LEIGH WOODS, BRISTOL.

A ranger's bungalow is to be erected in Leigh Woods. The architect is Mr. Frank W. Wills, and the execution of the work has been entrusted to Mr. Alfred Dowling, of Bishopston.

BANKING OFFICES, ALNWICK.

Lloyd's Bank, Ltd., have just completed alterations to premises which they recently acquired in Bondgate, Alnwick. The contract was let to Mr. Thomas Muckle, of Rothbury, and has been carried out by him with the aid of the following sub-contractors:—Messrs. Burn & Sons, of Spittal, for joiner work; Messrs. Reavell Brothers, of Alnwick, for plumbing and electric lighting; Mr. J. Purdie, of Alnwick, for slating and plastering; Messrs. Adam Robertson & Sons, of Alnwick, for painting and glazing; Messrs. Thomas Robertson & Sons, of Alnwick, for mahogany panelling and fittings; Messrs. Hodkin & Jones, of Sheffield, for ferro-concrete and mosaic; Messrs. Henry Hope & Sons, of Birmingham, for leaded glazing; Breala Company, of Newcastle, for asphalt; Messrs. Emley & Son, of Newcastle, for marble work; Messrs. Chatwood & Co., of Manchester, for strong-room door; the Adjustable Metal Shelving Company, of London, for steel strong-room fittings; Mr. Christian Neuper, of Newcastle, for stone carving; Messrs. Murray, McVinnie, & Co., of Glasgow, for keylock flooring; Mr. A. H. Henderson, of Alnwick, for blinds. The principal electroliers were made by Messrs. Powell & Son, of London. The work was carried out under the superintendence of the architect, Mr. George Reavell, jun.

MEMORIAL HALL, LOW FELL, DURHAM.

The Wesleyan Methodist Church at Low Fell has been extended by the erection of a memorial hall. Mr. Geo. A. Kirk, of Low Fell, was the sole contractor, and he has carried out the work under the direction of the architect, Mr. J. Walton Taylor, of Newcastle. The new hot-water system has been carried out by Messrs. MacKenzie & Moncur, of Edinburgh; the painting by Messrs. Dellow & Sons, of Low Fell; the plumbing work by Mr. M. Pearson, also of Low Fell; slaters' work by Mr. J. Hewitson, of Newcastle; plastering by Mr. Wood, of Gateshead; whilst the leaded glass has been supplied by Messrs. Reed, Millican, & Co., of Newcastle. The cost has been about 2,500*l.*

Appointment.

IMPERIAL COLLEGE OF SCIENCE AND TECHNOLOGY.

Sir Alfred Keogh, K.C.B., has been appointed Rector of the Imperial College. Surgeon-General Sir Alfred Keogh retired last year from the post of Director-General of the Army Medical Service, and had charge of a general hospital during the South African War.

Sanitary and Engineering News.

NEW BRIDGE OVER THE GANGES.

An important bridge, designed by Messrs. Rendel & Robertson, for the Eastern Bengal Railway, will be commenced this year. The structure will be 5,610 ft. long, comprising fifteen girder trusses 374 ft. long by 60 ft. deep, erected at such elevation as to give the clear headway of about 65 ft. at low water. The river piers will be built up from cylindrical foundations constructed by the caisson method. The steel caissons will be towed to their respective sites and sunk by the aid of staging carried by two large pontoons equipped with electric cranes and other appliances. Successive caisson rings will be added until the cutting edge of the first section enters the river bed, the interior being filled up with concrete as the work proceeds. After the bed of the river has been reached the work of sinking will be continued to the average depth of about 150 ft., but during this stage of the work the additions at the upper end will comprise only the lengthening of the inner steel tubes, and the building of cement-block casing, finished at the top by a monolithic concrete slab. The cost is estimated at more than a million pounds, and the execution of the work will probably extend over four or five years.

OULTON BROAD DRAINAGE SCHEME.

The Oulton District Council of Oulton Broad and the Council of the Borough of Lowestoft, having applied to the Local Government Board for a loan of 22,223*l.* and 5,058*l.* for the purpose of a scheme of sewerage for the urban district and the rural parts of Lowestoft (including the execution of works in the parish of Lowestoft), an inquiry was recently held on behalf of the Local Government Board by Mr. H. Shelford Bidwell, M.Inst.C.E., into the matter. The Borough Surveyor, giving evidence with regard to the Lowestoft portion of the scheme, explained that the proposal would enable them to deal with five outlying and low-lying districts, which could not be drained by Lowestoft except at great expense. Mr. Nicholson Lailey, engineer for the Oulton portion of the joint scheme, was also called, and read details of his scheme, which, he said, was mainly one of gravitation and pumping. The total storage capacity of the scheme was 66,600 gallons.

SEWAGE DISPOSAL SCHEME, BETHERSDEN.

The West Ashford Rural District Council propose to carry out a sewage disposal scheme for the parish of Bethersden, and their application for sanction to borrow for this purpose was the subject of a recent Local Government Board inquiry held by Mr. P. M. Crosthwaite, M.Inst.C.E. The work is estimated to cost about 2,800*l.*, and the engineer is Mr. J. Martin, M.Inst.C.E.

Miscellaneous.

PROFESSIONAL AND BUSINESS ANNOUNCEMENT.

Messrs. Welch & Atkinson, surveyors, have removed their offices from 10, Lancaster-place, Strand, to 27, Ebury-street, Eaton-square, S.W. Telephone number—Victoria 3790.

FARMING WOODS, NORTHAMPTONSHIRE.

This historical estate will be offered for sale in lots by auction in the course of next May. The property, extending over some 4,370 acres, was bought in at 105,000*l.* at a projected sale last autumn, and was subsequently purchased by private treaty. It lies between Oundle and Rockingham, in Brigstock bailiwick, in the valley of the Nene. A recent owner, Mr. Gardiner Muir, expended more than 30,000*l.* upon improvements of the estate. Within its confines stands the later manor-house, the Lyveden New Bield, or Building, which Sir Thomas Tresham, of Rushton, began, but did not complete, from designs which have been ascribed to John Thorpe—see his "Three Plans" in the Soane Museum and drawings by Mr. J. A. Gotch and Mr. Paul Waterhouse, illustrated in the *Builder* of July 21, 1883, and December 3, 1898. The Old Bield, the earlier manor-house, was rebuilt, and some say by Thorpe, during the lifetime of Sir Thomas Tresham (who died in 1605), and was finished by his second son, Lewis. Farming Woods is portion of the ancient royal forest of Rockingham. Charles I. sold it to Lord Mordaunt in 1641, and the estate subsequently devolved upon various owners, and latterly upon Lord Lyveden. A perambulation of Rockingham Forest, made in 14th Edward I., sets forth its boundaries as extending over more than thirty miles from Stamford to Northampton, with an average breadth of nearly nine miles, and embracing Burghley, Apethorpe, Kirby, Holdenby, Kingscliffe, Rushton, Rothwell, Twywell, and Geddington.

EXTENSIONS, EDINBURGH COLLEGE OF ART.

An extension of the Municipal College of Art in Edinburgh has been made by the erection of craft workshops. The new buildings are at the west end of the college, and the workshops are arranged in series surrounding the central designing-room, in which all the working drawings and cartoons are made. The crafts at present undertaken are stained glass, wood-carving, plaster work, silversmithing, repoussé and chasing, book-binding and leather tooling, embroidery, and needlework. The buildings were opened on the 2nd inst. with an exhibition of work done in the college, and such as it is the intention of the instructors to introduce. Mr. Douglas Strachan, head of Crafts Section, gave a lecture on "Design and Craft" in the evening. He said it was his intention to deal more particularly with the creative ideal of the designer or decorator, endeavouring to clear away some of the confusion that existed in students' minds regarding the relative positions of the pictorial aim and the decorative rather than to questions of working methods, which come more properly under the daily work of the college. Before dealing with the craft situation of to-day and the revival of interest in artistic craft, he referred to the confusion that undoubtedly had arisen regarding the terms art and craft, and the relation that exists between them. Craft, he said, could, unfortunately, exist apart from art, as its products supply a need that existed apart from any consideration of art expression. Furniture, houses, dress, and even jewellery, statues and pictures, mankind would have, art or no art. Art, on the other hand, could not exist apart from craft, that was, from material expression, and the technical skill of the artificer, be that expression pictorial or decorative, through the decline and disappearance of artistry from most of the crafts (the causes of which he indicated) they had fallen into the mistake of

separating painting and sculpture from the others. Through the work of a group of artists who in their own day had perceived the artistic possibilities of metal, wood, enamel, glass, etc., they now perceived that greatness lay not in the medium, but in the level of achievement.

NOVEL METHOD OF ARCH DEMOLITION.

Owing to the abolition of level crossings in the city of Worcester, Massachusetts, the old Union Station, built in 1877 from the designs of Messrs. Ware & Brunt, architects, is in course of replacement by a new station. After removal of the steel roof trusses, the next task was to take down the masonry arch, of 114 ft. clear span and the rise of 32 ft., at the east end of the station. The masonry head wall was first stripped down to the springings of the arch, leaving the ring in position. As the voussoirs measured 2 ft. square by from 5 ft. to 6 ft. long, the erection of falseworks for their removal would have been an expensive matter; it was decided by the engineer in charge of the work to try the effect of an attempt to bring down the arch by pulling at the crown. Accordingly a strong rope was secured to the keystone, and by the united efforts of several workmen the arch ring began to part at the springings. Coming over at first without visible distortion, the ring soon began to lose its form owing to the greater velocity of the centre portion, and after passing the angle of 45 deg. with the vertical the voussoirs separated and fell upon the brick *débris* on the ground. With the exception of the keystone, which was broken by falling upon some exposed object, none of the voussoirs were seriously damaged. The expedient here described is one which may not often be applicable, but deserves remembrance.

AN IMPERIAL INVENTIONS EXHIBITION.

An Inventions Exhibition is to be organised in connexion with the Festival of Empire in London, and is to be held at the Crystal Palace from May 24 to the end of July. The exhibits will be limited to inventions by British subjects, resident in Great Britain or the colonies. A special section will be allotted to models, and a staff of demonstrators experienced in this work will be in attendance for the purpose of explaining and demonstrating exhibits to all who are likely to be interested. Medals and diplomas will be adjudicated to those inventions exhibited which possess the greatest merit and commercial utility.

LONDON COUNTY COUNCIL TRADE SCHOLARSHIPS FOR BOYS.

We are asked to draw attention to the opportunities afforded by the London County Council's Trade Scholarships. By means of these scholarships boys may secure free education (with maintenance grant) at technical day schools, where they will receive such instruction as will prepare them on leaving school to take up either apprenticeships or employment in skilled trades. The following are the general conditions applicable to all the trade scholarships:—

(*a*) No candidate is eligible whose parents (or guardians) do not reside within the area of the administrative County of London.

(*b*) No candidate is eligible whose parents' (or guardians') annual income exceeds 160*l*.

(*c*) Candidates who are in attendance at public elementary schools must be working in the sixth (or higher) standard.

(*d*) Applications must be supported by the recommendation of head masters in respect of the intelligence, conduct, industry, and dexterity in handicraft of the candidates.

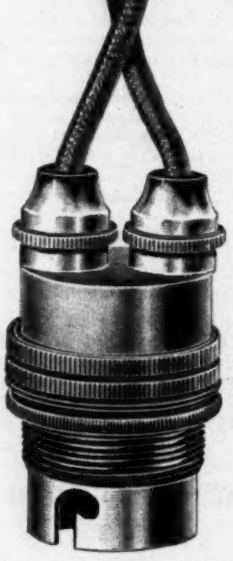
(*e*) Parents (or guardians) of candidates are required to sign a declaration that they intend the candidates, if successful, to enter the trade in which they will receive training during the tenure of their scholarships.

CHURCH BUILDING SOCIETY.

The Incorporated Society for Promoting the Enlargement, Building, and Repairing of Churches and Chapels held its usual monthly meeting on the 17th inst. at the Society's House, 7, Dean's-yard, Westminster Abbey, S.W., the Rev. Canon C. F. Norman in the chair. Grants of money were made in aid of the following objects, viz.:—Building new churches at Birmingham, St. Basil, 130*l*.; Birmingham, St. Benedict, 235*l*.; Beltinge, St. Bartholomew, Kent, 130*l*.; Longton, St. Chad, Staffs, 225*l*.; and Southend-on-Sea, St. Erkenwald, 200*l*.; rebuilding the Church of St. Paul, King Cross, Halifax, 250*l*.; and towards enlarging or otherwise improving the accommodation in the churches at Aldrington, St. Philip, Sussex, 100*l*.; Dymchurch, St. Peter and St. Paul, Kent, 25*l*.; Hackney Wick, St. Mary of Eton, Middlesex, 75*l*.; Stocklinch, St. Mary Ottersay, Somerset, 15*l*.; and Walpole, St. Peter, Norfolk, 20*l*. Grants were also made from the special mission buildings fund towards building mission churches at Caergeiliog, near Holyhead, 5*l*., making in all 20*l*.; Dockenfield, Frensham, Surrey, 35*l*.; Holloway, St. Padarn's Welsh church, Middlesex, 40*l*.; and Litherland, St. Andrew, near Liverpool, 40*l*. The following grants were also paid for works completed:—Southolt, St. Margaret, Suffolk, 15*l*.; Haslington, St. Matthew, Cheshire, 50*l*.; South Perrott, St. Mary, Dorset, 40*l*.; Little Fransham, St. Mary, Norfolk, 15*l*.; Cann, St. Rumbold, Dorset, 15*l*.; Smithfield, Wrexham, Denbighs, 30*l*.; and Fazakerley, St. Nathaniel, Liverpool, 25*l*. In addition to this, the sum of 300*l*. was paid towards the repairs of twenty-five churches from trust funds held by the Society. The Rev. T. T. Norgate, F.R.G.S., F.R.Hist.S., Secretary of the Clergy Friendly Society, was appointed Secretary of this Society to fill the vacancy caused by the recent death of Mr. Joseph Monday.

EVANS'S TWIN-GRIP PENDANT LAMPHOLDER.

Messrs. Bell Brothers & Co., of 63, Bishopsgate-street Within, E.C., are bringing out a novel lampholder, which has been invented by Mr. H. E. Evans. It will be seen from the illustration that the flexible wires are kept well apart in entering the holder, so that short circuits at the cord grip are practically impossible. Another advantage of the arrangement



The Evans Twin-grip Pendant Lampholder.

is that if one of the screws holding in one side of the "flex" works loose, the lampholder and lamp are suspended by the other one, and the light merely goes out. As counter-weights, shades, and expensive metallic filament lamps are often supported by the flexible wires, this is an important consideration. In our opinion lampholders of this type will be of use in many cases.

PROPOSED COUNCIL SCHOOL, TIVERTON.

At the last meeting of the Tiverton Town Council the Education Committee reported, with reference to the Council's decision to build a new boys' school in Westexe, that they had invited Mr. Ashford to prepare a sketch plan for approval.—Mr. W. H. Martin proposed that the work of drawing the plans be thrown open.—Mr. S. Deering thought the Borough Surveyor should draw the plans, and be paid the usual commission.—It was eventually decided to refer the matter back to the Education Committee, with the recommendation that the plans be thrown open to competition, but without premium.

ANCIENT MONUMENTS PROTECTION BILL.

In the House of Lords on Thursday last week the Earl of Granard, in moving the second reading of the Ancient Monuments Protection Bill, said that ancient monuments were regulated by two Acts of Parliament. The first, which was passed in 1882, empowered the Commissioners of Works to purchase and accept as gifts or by bequest monuments specified in the schedule of the Act. These were mainly prehistoric works, and did not include buildings of an historic character. The Act of 1882 was amended in 1900, when the Commissioners were enable to accept as gifts or to purchase monuments of historical or national interest, but they were not given the power to accept any such monuments by bequest. At the present moment a gentleman, who should be nameless, who was possessed of one of the finest national and historical monuments in this country, desired to bequeath it to the State, but as the law at present stood the Commissioners were not allowed to accept such a bequest. Hence the necessity for this Bill.—Lord Avebury, speaking as one who was partly responsible for the Act of 1882, said that they would have been very glad to have extended it at the time, but found it impossible then to get all that they wished. He heartily welcomed the Bill.—The Bill was read a second time.

ESTIMATES: PUBLIC WORKS AND BUILDINGS.

The estimates for Civil Services (Class I., Public Works and Buildings) for the year ending March 31, 1911, present a net total of 3,452,294*l*., being an increase of 194,482*l*. as compared with the grants made last year. The item of 131,100*l*. for Labour Exchange buildings in Great Britain shows an increase of 61,000*l*.; the estimated cost of the execution and erection of a monument in Westminster Abbey to the late Sir Henry Campbell-Bannerman, Prime Minister, is set down as 2,100*l*.

INTERNATIONAL ART EXHIBITION, BUENOS AYRES.

The centenary of the Argentine independence will be celebrated in Buenos Ayres by an exhibition of International Art, from May 25 to September 30. The exhibition will include the following international sections:—Oil painting; water-colour; pastel; design; sculpture; architecture; decorative art; graphic art. Foreign artists of repute will be invited to send exhibits, which will not be submitted to the approval of a committee; only the available space may limit the quantity of contributions accepted. These invitations to be issued by the separate committees of each nationality. Grands prix, gold, silver, and bronze medals, also honourable mentions, will be awarded. The entries are to be forwarded to the Exhibition of International Art, Buenos Ayres, Plaza San Martino, before the end of April. The Executive Committee will defray the expenses of unpacking and repacking, as well as those of return carriage at the close of the exhibition. All communications should be addressed to the Commissary General of the Exhibition of International Art, Rue Cangallo 827, Buenos Ayres.

THE TROLLHÄTTA CANAL, SWEDEN.

The Swedish Government has decided on rebuilding and enlarging the Trollhätta Canal. This forms the western stretch between Gotenburg on the Cattegat and Wenersborg on the Werner See of the Gota Canal, built from 1810-1832, which has a total length of 387 kms. At present the Trollhätta Canal is only 3 metres deep, and its locks are only 36·5 metres long and 7 ms. wide. It will now be deepened so as to accommodate ships of 4 metres draught and 1,300 tons. Preparations will be made to increase the depth later to 5 metres. This enlargement of the canal will take five years, and cost about 30 million kronen. It will enable steamers and lighters from the Baltic, the North Sea, and the French coast to penetrate into the new Swedish industrial centres.

PROPERTY SALES.

Properties now in the market comprise the house "Red Roofs," Streatham Common, designed after the Tudor style by Mr. Ernest George, A.R.A., for his own occupation, and fitted with some old carving and Early XVIIth century glass, and Mr. Watson Taylor's Erlestoke estate of some 7,400 acres in the neighbourhood of Westbury and Devizes. The property embraces Edington, the reputed scene of King Alfred's defeat of the Danes in 878, and the native home of William, Bishop of Winchester, in 1345-66, and Lord High Chancellor. He founded, 1347, in Edington, a college of priests in honour of the Virgin and All Saints, which, by desire of the Black Prince, he re-endowed as a Priory of Augustinian "Bonhommes," of which the yearly revenues, at the Suppression, amounted to 521*l*. 12s. 5d. Bishop William rebuilt the cruciform church in the transition style of his day, and also rebuilt the west end of Winchester Cathedral. Some remains, with the fish ponds and walled gardens, still exist of the priory, which, at the Dissolution, was bestowed upon Lord Seymour, of Sudeley: after his death on the scaffold the estate passed to Sir William Paulet, Marquis of Winchester, the builder of Basing, and his descendants, the Dukes of Bolton. Jack Cade's men destroyed the palace at Edington of the Bishops of Salisbury, 1450, and stoned Bishop Ayscough to death. The manor belonged for a while to

MISCELLANEOUS—*Continued on page 367.*

List of Competitions, Contracts, etc.

For some Contracts still open, but not included in this List, see previous issues. Those with an asterisk (*) are advertised in this Number: Competitions, —; Contracts, iv. vi. viii. x.; Public Appointments, xvi.; Auction Sales, xxiv.

Certain conditions, beyond those given in the following information, are imposed in some cases, such as: the advertisers do not bind themselves to accept the lowest or any tender; that a fair wages clause shall be observed; that no allowance will be made for tenders; and that deposits are returned on receipt of a bonâ-fide tender unless stated to the contrary.

The date given at the commencement of each paragraph is the latest date when the tender, or the names of those willing to submit tenders, may be sent in.

***** It must be understood that the following paragraphs are printed as news, and not as advertisements; and that while every endeavour is made to ensure accuracy, we cannot be responsible for errors that may occur.**

Competitions.

FEBRUARY 10-MARCH 31.—**Sheffield.**—CHURCH.—Plans desired for church for 650, institute for 150, primary department for 125, junior department for ninety-five, and caretaker's apartments, Endcliffe Park. Premium, not merged in commission, 35*l.* Assessor, Mr. Chas. Hadfield, F.R.I.B.A. Questions until Febuary 10. On receipt of 5*s.* the Secretary will furnish conditions and instructions, with plan of site. Deposit returned only to those who send plans. Secretary, Mr. J. W. Nicholls, 64, Everton-road, Brocco Bank, Sheffield.

APRIL 29.—**Pontefract.**—COUNCIL SCHOOL.—The Education Authority invite competitive designs from architects practising in Yorkshire for the erection of an elementary school. Conditions of competition and plan of site can be obtained from Mr. W. Haddock, Town Clerk, on payment of 1*l.* 1*s.*

APRIL 30.—**Shardlow.**—SEWERAGE, ETC.—Shardlow R.D.C. desire to provide for the sewerage and sewage disposal of the contributory places of Spondon and Breaston, and they invite competitive schemes. Competitors to supply plans, sections, specification, detailed report, and estimate of the probable cost, which are to be delivered at the office of Mr. J. W. Newbold, Clerk to the Council, Becket-street, Derby.

MAY 31.—**Karachi.**—MUNICIPAL OFFICE.—The Municipality of Karachi invite elevation designs and detailed plans and estimates for a new Municipal Office. For further particulars see advertisement in our issue of December 25.

JUNE 15.—**Acton.**—NEW SCHOOLS.—The Acton U.D.C. Education Committee invite designs for new schools at Rothschild-road. For further particulars see advertisement in our issue of March 12.

AUGUST 23.—**Navan.**—COUNTY OFFICES.—Meath C.C. invite architects in Ireland to submit plans and specifications for the building of new County Offices at Navan. Copies of Sites Committee Report can be had on application from the Secretary, Meath C.C., Navan.

Contracts.

BUILDING.

The date given at the commencement of each paragraph is the latest date when the tender, or the names of those willing to submit tenders, may be sent in.

MARCH 28.—**Cavan.**—REPAIRS.—The Board of Guardians invite tenders for (1) repairing the ceiling of the entrance lodge; (2) rebuilding a chimney and doing other repairs at the Fever Hospital. Mr. Joseph D. Grier, Clerk of the Union.

MARCH 29.—**Cambridge.**—ADDITIONS, ETC.—The Guardians invite tenders for the making of certain additions and alterations to the porter's lodge at the Workhouse, Mill-road, Cambridge. Plan, etc., prepared by Mr. Sidney French, architect. Plans, etc., to be seen, and quantities obtained, at office of Mr. John Congreve, Clerk to the Guardians, 55, St. Andrew's-street, Cambridge.

MARCH 29.—**Edinburgh.**—SCHOOL WORK.—Edinburgh School Board invite estimates for the carrying out of works in connexion with alterations to be made on West Fountainbridge School. Plans may be seen, and schedules obtained, at the School Board Offices, Castle-terrace, Edinburgh.

MARCH 29-APRIL 12.—**Forest Hall.**—SCHOOL.—Northumberland Education Committee invite tenders for the work of erecting a new Council school to accommodate 370 scholars at Forest Hall. Name and address to Mr. C. Williams, Secretary to the Education Committee, The Moothall, Newcastle-on-Tyne. Deposit of 2*l.* 2*s.* for specification and bills of quantities. Plans for the work may be inspected at the office of Messrs. Hope & Tasker, architects, Trinity-buildings, New Bridge-street, Newcastle-on-Tyne.

MARCH 29.—**Llandrindod Wells.**—VILLA.—Erection of new villa at Llandrindod Wells for Dr. Ackerley. Plans may be seen, and bills of quantities obtained from the office of Messrs. Alfred Swash & Son, F.R.I.B.A., architects, "The Mount," Llandrindod Wells, upon deposit of 1*l.* 1*s.*

MARCH 29.—**Penallta.**—HOUSES.—Forty dwelling-houses at Penallta, Gelligaer, for the Trustees of the Penallta No. 1 Building Club. Plans, etc., can be seen, and full particulars obtained, at the office of Mr. Geo. Kenshole, M.S.A., architect, Station-road, Bargoed.

MARCH 30.—**Ballyboden.**—LIBRARY.—South Dublin R.D.C. (Whitechurch Library Committee) invite tenders for the erection of a public library at Ballyboden, Rathfarnham, according to plans, etc., prepared by Mr. T. J. Byrne, A.R.I.B.A., architect, 1, James's-street, Dublin. Plans, etc., may be seen, and forms of tender obtained, at the office of the architect.

MARCH 30.—**Belfast.**—HOUSES.—Erection of a terrace of six houses on the Ravenhill-road. Plans, etc., may be had at office of Mr. Thomas Houston, architect and civil engineer, Kingscourt, Wellington-place, Belfast.

MARCH 30.—**Bradford.**—WAREHOUSE.—Erection of wool warehouse, Grattan-road, Bradford. Application to the architect, Mr. William A. Ross, 10, Parkinson's-chambers, Hustlergate Bradford.

MARCH 30.—**Chesterfield.**—OFFICES.—The Chesterfield Gas and Water Board invite tenders for the erection of new offices at the junction of West Bars with Foljambe-road. Plans, etc., may be seen, and bills of quantities, etc., obtained, on application to the Borough Surveyor's office, Salter Gate, Chesterfield, on payment of 3*l.* 3*s.*

MARCH 30.—**Kincraig.**—OFFICES AND ADDITIONS TO MANSE.—Mason, carpenter, slater, plumber, plasterer, painter, and glazier works of new offices and additions and alterations to the Manse of Insh, Kincraig. Plans, etc., may be seen with the architect, Mr. Alexander Mackenzie, C.E., Kingussie.

MARCH 30.—**King's Lynn.**—SHEDDING, ETC., FOR SHOW, JUNE 15 AND 16.—Forms can be had on application to the Secretaries, Messrs. Caleb Barker & Co., East Harling, Norfolk.

MARCH 31.—**Naas.**—HOUSE.—Erection of a house at Naas for Miss Kiely. Drawing, etc., can be seen at office of Mr. J. J. O. Ramsay, M.E., architect, Dunlavin, Co. Wicklow.

MARCH 31.—**Salford.**—DISINFECTING STATION.—Building an addition to the disinfecting station at Mode Wheel. Plans may be seen, and the specified quantities, etc., obtained at the office of the Borough Engineer.

APRIL 1.—**Frizinghall.**—ALTERATIONS TO CHEMICAL WORKS.—The Corporation invite tenders for masons', joiners', plumbers', and slaters' work required in alterations to the Chemical Works, Frizinghall. Drawings, etc., may be seen, and bills of quantities and form of tender obtained, on application to the City Architect, Town Hall, Bradford.

APRIL 2.—**New Ross.**—WORKHOUSE ALTERATIONS, ETC.—Proposed works of sanitation and alteration to Workhouse. Plans, etc., may be seen at the Board-room, New Ross, and at the office of the architect, Mr. J. A. Ryan, 33, Catherine-street, Waterford.

APRIL 2.—**Portadown.**—ADDITIONS TO HALL.—Erecting a residence and making additions to the Masonic Hall, Portadown. Plans, etc., may be seen at the office of the architect, Mr. J. W. Walby, Portadown.

APRIL 2.—**Sheffield.**—SCHOOL BUILDINGS.—Erection of school buildings, etc., Psalter-lane, Sheffield, for the Committee of the Boys' Charity School. Drawings, etc., may be seen, and bills of quantities obtained, on application at offices of Messrs. Gibbs, Flockton, & Teather, architects, 15, St. James's-row, Sheffield.

* APRIL 4.—**Camberwell.**—QUAY WALL.—The Camberwell B.C. invite tenders for the construction of a new quay wall at the Council's Depôt, Peckham Park-road. See advertisement in this issue for further particulars.

APRIL 4.—**Halifax.**—ADDITIONS.—Additions to "Ashfield," Burnley-road, Halifax. Plans, etc., may be seen, and bills of quantities obtained, at offices of Messrs. Clement Williams & Sons, architects, Post-office-buildings, Commercial-street Halifax.

APRIL 4.—**Hamilton.**—POST-OFFICE ALTERATIONS.—The Commissioners of H.M. Works and Public Buildings invite tenders for alterations at Hamilton Post-office. Drawings, etc., may be seen on application at the Post-office, Hamilton. Bills of quantities, etc., may be obtained at H.M. Office of Works, 3, Parliament-square, Edinburgh, on payment of 1*l.* 1*s.*

APRIL 4.—**Hollywell.**—REPAIRS, ETC.—Repairs and structural improvements of St. Patrick's Church, Hollywell (near Belcoo). Plans, etc., prepared by Messrs. Anthony Scott & Son, architects, 49, Upper O'Connell-street, Dublin. The plans can be seen at the residence of the Rev. P. J. Cullinan, C.C., Belcoo.

APRIL 5.—**Clayton.**—ADDITIONS, ETC.—Alterations and additions to Paddock Dye Works, Pasture-lane, Clayton, Bradford. Plans, etc., may be seen, and quantities obtained, at office of Mr. Sam Spencer, architect, Old Bank-chambers, Great Horton, Bradford.

APRIL 5.—**Deptford.**—TOWN HALL INTERNAL REPAIRS AND PAINTING.—The B.C. invite tenders from Deptford builders and decorators for carrying out internal repairs and painting works at the Town Hall, New Cross-road. Specifications, etc., can be obtained from the Borough Surveyor at the Town Hall.

APRIL 5.—**Margate.**—STEPS.—Tenders are invited for (*a*) the construction of steps leading from Hodges Flagstaff to Palm Bay, Margate, and (*b*) the construction of a brick wall on the face of the cliff. Plans, etc., can be seen, and all further particulars obtained, on application to Mr. Ernest A. Borg, Borough Surveyor, 13, Grosvenor-place, Margate.

APRIL 5.—**Smalley, Derby.**—SCHOOL.—New infant school for ninety children, Richardson's School Foundation. Plans, etc., may be inspected on application to Mr. H. H. Dix, Clerk to the Governors, Smalley, Derby.

* APRIL 5.—**Wood Green.**—CORRIDOR.—The Wood Green U.D.C. invite tenders for filling-in to sides of corridor and covered way to temporary classrooms, Lordship-lane School. See advertisement in this issue for further particulars.

* APRIL 6.—**London.**—ALTERATIONS.—The Metropolitan Asylums Board invite tenders for alterations to the discharge block at the North-Eastern Fever Hospital, Tottenham, N. See advertisement in this issue for further particulars.

APRIL 11-29.—**Leytonstone.**—SCHOOL.—Essex Education Committee (Leyton Higher District Sub-Committee) invite tenders for the erection of a new County High School for 300 girls, Forest-road, Leytonstone, Essex. Plans, etc., by the architect, Mr. W. Jacques, A.R.I.B.A., 2, Fen-court, Fenchurch-street, London, E.C. Names and addresses, together with a deposit of 5*l.*, to the architect.

APRIL 11.—**Pocklington.**—SCHOOL ALTERATIONS, ETC.—East Riding of Yorkshire C.C. Education Committee invite tenders for alterations and additions to the Council school at Pocklington. Plans, etc., may be seen, and forms of tender obtained, on application to the Building Surveyor, County Hall, Beverley.

APRIL 11.—**South Duffield.**—TEACHER'S HOUSE.—East Riding of Yorkshire C.C. Education Committee invite tenders for the erection of a teacher's house and alterations to school at South Duffield. Plans, etc., may be seen, and forms of tender obtained, on application to the Building Surveyor, County Hall, Beverley.

APRIL 12.—**Durham.**—SCHOOLS.—Plans, etc., may be seen, and bills of quantities obtained, as follows:—Middleton St. George, Hartburn, and Whitton new schools, at the office of Mr. W. Rushworth, Shire Hall, Durham; alterations and improvements at Usworth Colliery, Littletown, and Consett Cookery Centre (plans, specifications, and general conditions of contract only), at the office of Mr. F. E. Coats, Shire Hall, Durham.

* APRIL 12.—**Wrexham.**—TELEPHONE EXCHANGE.—The Commissioners of H.M. Works and Public Buildings invite tenders for a telephone exchange at Wrexham. See advertisement in this issue for further particulars.

* APRIL 13.—**Herne Bay.**—PIER PAVILION.—The Herne Bay U.D.C. invite tenders for a pier pavilion on their new pier extension at Herne Bay. See advertisement in this issue for further particulars.

* APRIL 16.—**Lower Sandhurst.**—ENLARGEMENT.—The Berkshire Education Committee invite tenders for enlargement of the Council School at Lower Sandhurst, Berks. See advertisement in this issue for further particulars.

APRIL 19.—**Hazel Grove.**—SCHOOL.—Cheshire Local Education Authority (Administrative Sub-Committee for the Ashton-under-Lyne and Stockport Unions' District) invite tenders for the erection of a new public elementary Council school, Chapel-street, Hazel Grove, near Stockport, to accommodate 800 children. Plans, etc., may be inspected, and quantities obtained from the architect, Mr. C. T. Adshead, Leinster-chambers, 4, St. Ann's-square, Manchester, on payment of a deposit of 2*l.* 2*s.*

APRIL 21.—**Builth Wells.**—SCHOOL.—Breconshire Education Committee invite tenders for the erection of a new mixed and infants' school (346 places) and cookery kitchen at Builth Wells. Names to Mr. Charles W. Best, M.Inst.C.E., Surveyor to the Breconshire Education Committee, County Hall, Brecon, accompanied by particulars of works recently carried out and the names of two references relative to the quality of the work done.

* APRIL 25.—**Farnborough.**—SCHOOL.—The Southampton C.C. invite tenders for new Council school at Cove, near Farnborough. See advertisement in this issue for further particulars.

* APRIL 29.—**Leytonstone.**—SCHOOL.—The Essex Education Committee invite tenders for new County High School for Girls at Forest-road, Leytonstone. See advertisement in this issue for further particulars.

NO DATE.—**Castlerahan.**—COTTAGES.—The R.D.C. invite tenders for the erection of labourers' cottages throughout the district in accordance with the amended plans prepared by Mr. Michael Grace, jun., the Council's Engineer. Full particulars can be had on application to the Engineer or to Mr. Peter Brady, Clerk of Council, D.C. Offices, Oldcastle Workhouse.

NO DATE.—**Derby.**—NIGHTINGALE NURSING HOME EXTENSIONS.—The Board of Management of the Royal Derby and Derbyshire Nursing and Sanitary

BUILDING—*continued.*

The date given at the commencement of each paragraph is the latest date when the tender, or the names of those willing to submit tenders, may be sent in.

Association invite tenders for the erection of additional wards to the Nursing Home. Plans may be seen, and bills of quantities obtained, at the offices of the architects, Messrs. Thorpe & Fryer, 23, St. James's-street, Derby, on payment of a deposit of 1*l.* 1s.

No DATE.—**Downham Market.**—NEW BILLIARD-ROOM.—Erection and completion of a new billiard-room for the Downham and Clackclose Conservative Club at Downham Market, Norfolk. Plan, etc., can be seen, and bills of quantities obtained, upon application at the offices of Mr. Louis F. Engleton, architect and surveyor, King-street, King's Lynn.

No DATE.—**East Heddon.**—HOUSES.—The Small Holdings and Allotments Committee of County of Northumberland invite tenders for the erection of houses and buildings on the East Heddon Estate. Names to Mr. Arthur P. Ker, County Land Agent, the Moothall, Newcastle.

* No DATE.—**Wye.**—ADDITIONS.—The Governors of the South-Eastern Agricultural College, Wye, invite tenders for additions to the college buildings at Wye. See advertisement in this issue for further particulars.

ENGINEERING, IRON, AND STEEL.

MARCH 30.—**Fowey.**—DREDGING PLANT.—The Fowey Harbour Commissioners invite tenders for the execution of certain repairs to their dredging flat enterprise, now lying in Fowey Harbour. The specification can be seen at the Harbour Office, Albert Quay, Fowey.

MARCH 30.—**Middleton.**—CONDENSER.—The Corporation of Middleton invite tenders for the erection of a new condenser at the Gasworks. Further particulars, etc., may be obtained on application to Mr. C. F. Broadhead, Gas Engineer, Gasworks, Middleton.

APRIL 1.—**Chichester.**—SUCTION GAS ENGINE AND PLANT.—The Council invite tenders for the supply and erection, upon foundations, of a 20 B.H.P. suction gas engine and suction gas plant complete, at the Sewage-disposal Works, Appledram, near Chichester. Any further details may be obtained from Mr. Frank J. Lobley, A.M.Inst.C.E., the City Surveyor and Engineer.

APRIL 5.—**Manchester.**—ENGINE, ETC.—The Corporation Tramways Committee invite tenders for the supply and delivery of one four-cylinder engine and chassis, for use as motor tower wagon. Forms of tender, etc., may be obtained on application to Mr. J. M. McElroy, General Manager, Corporation Tramways, 55, Piccadilly, Manchester.

APRIL 6.—**London.**—DECK SPANS, ETC.—The East Indian Railway Company invite tenders for the supply and delivery of (1) deck spans for Tonse Bridge (seven 150 ft. and two 32 ft.); (2) steel fishplates, as per specifications to be seen at the company's offices, Nicholas-lane, London, E.C. For each specification a fee of 1*l.* 1s. is charged, which cannot be returned.

APRIL 12.—**Bacup.**—IRWELL BRIDGE.—The C.C. of Lancashire and the Corporation of Bacup invite tenders for the covering in of the River Irwell with masonry and brick arch, for a length of about 300 lin. yds. Plans may be seen, and copies of the specification, etc., obtained, at the County Bridgemaster's office, 8, East-cliff, Preston.

APRIL 12.—**Bury.**—BRIDGE WORK.—The C.C. of Lancashire, the Corporation of Bury and the U.D.C. of Radcliffe invite tenders for the widening of Hardy's Gate (County) Bridge. Plans may be seen, and copies of the specification, etc., obtained, at the County Bridgemaster's office, 8, East-cliff, Preston.

APRIL 12.—**Hyde.**—BRIDGE WORKS.—The C.C. of Lancashire and Cheshire, the Corporation of Hyde, and the U.D.C. of Denton invite tenders for the widening of Broomstair (County) Bridge. Plans may be seen, and copies of the specification, etc., obtained, at the County Bridgemaster's office, 8, East-cliff, Preston.

APRIL 14.—**Egypt.**—PUMPING MACHINERY.—The Ministry of Public Works (Egyptian Government) invite tenders for sewage pumping plant. Copies of the conditions of tender, etc., may be obtained on application from Mr. A. L. Webb, C.M.G., Queen Anne's-chambers, Broadway, Westminster, London, S.W., and the Commercial Intelligence Branch of the Board of Trade, London. Copies of the detailed description of work, together with plans, etc., can be obtained upon payment of the sum of 5*l.* 2s. 6d. from the office of Mr. A. L. Webb.

APRIL 16.—**Rochdale.**—RESERVOIR.—The Corporation invite tenders for the construction of a covered service reservoir on land belonging to the Corporation, adjacent to Thornham New-road. The drawings may be seen, and a copy of the specification, etc., may be obtained, on payment of 5*l.* 5s., at the offices of Messrs. H. Rofe & Son, civil engineers, 8, Victoria-street, Westminster, S.W., and Oxford-chambers, Victoria-square, Leeds.

MISCELLANEOUS.

MARCH 28.—**Bailieborough.**—GATES.—The U.D.C. invite tenders (1) for three iron gates with railway steel piers in Curkish; (2) erection of four similar gates; (3) repair of outside fence; (4) building wall. Mr. Hugh Clarke, Clerk D.C., Workhouse, Bailieborough.

MARCH 30.—**Ashton-under-Lyne.**—BOOKCASE.—The Guardians invite tenders for the supply and erection in the basement of the Poor Law Offices of one mild steel bookcase. Mr. G. H. Partington, Clerk, Ashton-under-Lyne.

MARCH 30.—**Edinburgh.**—GYMNASTIC APPARATUS.—The Magistrates and Council invite tenders for providing and fitting up gymnastic apparatus at Recreation Ground, East Meadows. Drawings, etc., may be seen at the office of Mr. James A. Williamson, A.R.I.B.A., City-chambers.

MARCH 30.—**London.**—AIR LOCKS.—Bombay, Baroda, and Central India Railway Directors invite tenders for the supply of air compressors, air locks, etc. Forms, etc., can be obtained at offices of Mr. C. Crommelin, Secretary, Gloucester House, 2, 3, and 4, Bishopsgate-street Without, London, E.C., on payment of 21s. each (which will not be returned).

MARCH 30.—**Wortley.**—CARTAGE.—Cartage of materials for the repair of highways. Forms of tender on application to Mr. F. Crawshaw, surveyor, 45, Exchange-street, Sheffield.

MARCH 31.—**Berkhamsted.**—ROSTIN'S AUTOMATIC CONTROLLERS.—For the supply of above to the whole of the public lamps in Berkhamsted. Full particulars can be obtained at the office of Mr. Edward H. Adey, Surveyor, U.D.C., 135, High-street, Berkhamsted.

APRIL 1.—**Wallsend.**—FIRE BRIGADE.—The Corporation of Wallsend invite tenders for the supply of a fully equipped motor tender and fire-escape. Specification may be seen on application to the Borough Surveyor, Town Hall, Wallsend.

APRIL 2.—**Chester.**—CARTING.—Cheshire C.C. invite tenders for carting macadam and other materials for the main roads. Forms of tender, etc., at the County Surveyor's office, Chester Castle.

APRIL 2.—**Windsor.**—CARTAGE.—The Windsor R.D.C. invite tenders for cartage of road materials. Forms of tender may be obtained upon application to the Surveyor to the Council, Mr. William Menzies, Englefield Green, Surrey.

APRIL 2.—**Windsor.**—CARTAGE.—Windsor R.D.C. invite tenders for the supply of horses and carts for day work in the Parish of Clewer Without. Forms of tender may be obtained on application to the Surveyor to the Council, Mr. William Menzies, Englefield Green, Surrey.

APRIL 4.—**Sawbridgeworth.**—STREET WATERING.—The U.D.C. invite tenders for street watering, etc., for the ensuing season. Particulars, etc., can be obtained of Mr. William Morris, Clerk, 15, Bell-street, Sawbridgeworth.

APRIL 4.—**South Stoneham.**—CARTING.—The R.D.C. invite tenders for carting of gravel and for the carting of flint and granite. Full particulars can be had upon application to Mr. W. J. Potter, "Glenroy," Portswood, the District Surveyor to the Council. Forms of tender upon application at the office of Mr. E. T. Westlake, Clerk, 20, Portland-street, Southampton.

APRIL 4.—**South Stoneham.**—STEAM ROLLING.—The R.D.C. invite tenders for steam rolling the County roads. Forms of tender can be obtained upon application at office of Mr. E. T. Westlake, Clerk, 20, Portland-street, Southampton.

APRIL 5.—**Maldon.**—CARTING.—The R.D.C. of Maldon invite tenders for the carting of materials. Forms will be supplied on application to Mr. Edgar J. Ennals, surveyor, 6, Market-hill, Maldon, Essex.

APRIL 9.—**Tinsley.**—FENCE.—The Tinsley P.C. invite tenders for the erection of a boarded fence dividing the cricket ground from the recreation ground. Specification, etc., can be obtained from Mr. J. L. Winkley, Clerk to the Council, 15, Harrowden-road, Tinsley, Sheffield, on receipt of stamped addressed foolscap envelope.

APRIL 13.—**Chryston and Muirhead.**—SCAVENGING.—The Sub-Committee of the District of the Lower Ward of Lanark invite offers for the work of scavenging the above district for the year, as per the specification, prints of which may be had on application to Mr. Hugh Wallace, Clerk to Sub-Committee.

NO DATE.—**Keighley.**—SEATS.—Tenders are invited for sixty seats for Victoria Park. Particulars from the Borough Engineer.

PAINTING, etc.

MARCH 25.—**Salisbury.**—COLOURING, ETC.—The Committee of Management of the Infirmary invite tenders for colouring, painting, and cleaning the wards and other parts of the Hospital and the Victoria Home. A specification may be seen, and quantities obtained, upon application to Mr. M. Harding, High-street, Salisbury.

MARCH 30.—**Chesterfield.**—PAINTING, ETC.—The B.C. invite tenders for painting and varnishing the Public Baths in South-place. Specification may be obtained on application at the Health Office, Saltergate.

APRIL 1.—**Great Yarmouth.**—PAINTING.—The Free Libraries and Museums Committee invite tenders for the inside painting, colouring, etc., of the Carnegie Library, News Room, and Museum. Specifications, etc., can be obtained from the office of the Borough Surveyor.

* APRIL 6.—**London.**—CLEANING, PAINTING, ETC.—The Metropolitan Asylums Board invite tenders for cleaning, painting, and repairs at the following fever hospitals:—(*a*) Grove Fever Hospital, Tooting; (*b*) North-Western Fever Hospital, Hampstead; (*c*) Western Fever Hospital, Fulham; (*d*) Brook Fever Hospital, Woolwich; (*e*) South-Eastern Fever Hospital, New Cross. See advertisement in this issue for further particulars.

* APRIL 7.—**Chelsea.**—PAINTING, ETC.—The Chelsea B.C. invite tenders for painting and repairs to Ons'ow-dwellings, Pond House, and Sir Thomas More-buildings. See advertisement in this issue for further particulars.

APRIL 21.—**Huddersfield.**—PAINTING.—The Corporation of Huddersfield invite tenders for the painting and decorating of the Town Hall, crush-room, and artistes' retiring-rooms. Plans, etc., may be seen, and bills of quantities, etc., obtained, on application at the offices of Mr. K. F. Campbell, M.Inst.C.E., Borough Engineer, 1, Peel-street, Huddersfield.

ROADS, SANITARY, AND WATER WORKS.

MARCH 29.—**Whitchurch, Llandaff.**—STREET WORKS.—Llandaff and Dinas Powis R.D.C. invite separate tenders for (1) Alfreda-road, The Avenue, The Parade; (2) Pommergelli-road, Pommergelli-lane East, etc. Plans, etc., may be seen, and bills of quantities obtained, on application to the Surveyor, Mr. James Holden, A.M.Inst.C.E., 20, Park-place, Cardiff.

MARCH 30.—**Corstorphine.**—DRAINS, ETC.—Water of Leith Purification and Sewerage Commissioners invite tenders for the following works, viz.:—(1) The construction of a system of surface-water drains at Corstorphine; (2) the construction of a branch sewer at Bonnington Skinnery, Edinburgh. Plans may be seen, and copies of the specifications, etc., obtained, at the office of the Commissioners' Engineer. Deposit with Mr. H. Inglis Lindsay, W.S., Clerk to the Commissioners, 16, Queen-street, Edinburgh, the sum of 1*l.* for each schedule.

MARCH 30.—**Dublin.**—TERENURE WATER.—The South Dublin R.D.C. invite tenders for providing and laying water mains and accessories in the Crumlin and Terenure portions of the Rural District. Drawings, etc., may be inspected at the Council's Offices, James's-street, Dublin.

MARCH 30.—**Hull.**—PAVING, ETC.—The Corporation invite tenders for certain works of paving, flagging, etc., in Stoneferry-road and Lockwood-street. Forms of tender, etc., may be obtained at the City Engineer's office.

MARCH 30.—**Plymouth.**—DRAIN.—Reconstruction of the common drain in the rear of Brunswick-terrace. Plans, etc., may be seen at offices of Mr. James Paton, Borough Engineer, Municipal Offices, Plymouth.

MARCH 30.—**Prestwich.**—STREET WORKS.—The Prestwich U.D.C. invite tenders for works of private street improvement. The plans, etc., will be open for inspection at the office of the Surveyor, Chester Bank. Copies of the bill of quantities, etc., can be obtained from the Surveyor on payment of 1*l.* 1s.

MARCH 30.—**Spofforth.**—SEWERAGE.—Wetherby R.D.C. invite tenders for the construction of about 3,700 lin. yds. of 9-in., 8-in., and 6-in. earthenware pipe sewers. Drawings, etc., may be seen, and quantities, etc., obtained, at the office of the Engineer, Mr. H. A. Johnson, M.Inst.C.E., 15, The Exchange, Bradford, on payment of a deposit of 2*l.* 2s.

MARCH 31.—**Aspull.**—STREET WORKS.—The U.D.C. invite tenders for private street improvements. Plans, etc., may be seen, and bills of quantities obtained, on application to Messrs. Heaton, Ralph, & Heaton, architects and surveyors, of King-street, Wigan.

MARCH 31.—**Cole Valley.**—MAIN SEWER, SECTIONS 4 AND 5.—Yardley R.D.C. invite tenders for 983 yds. of brick and concrete sewer and 90 yds. of cast-iron sewer, etc. Plans, etc., may be seen on application to the Acting Surveyor and Engineer, Mr. Philip H. Thompson, at the Council House, Sparkhill, near Birmingham. Specification, etc., may be obtained on application to him on payment of a deposit of 3*l.* 3s.

MARCH 31.—**Oldham.**—EXCAVATING.—The Markets and Baths Committee invite tenders for the excavation required in levelling lands and building concrete retaining walls at the Market Grounds, Victoria Market. Particulars, etc., may be obtained at the Borough Surveyor's office.

APRIL 4.—**Wolverhampton.**—ASPHALTING.—The Guardians invite tenders for asphalting yards at the Workhouse, Heath Town, and at the Cottage Homes, Wednesfield. Plans, etc., can be seen, and particulars obtained, upon application to Mr. T. H. Fleeming, architect, 10, Queen-square, Wolverhampton.

* APRIL 6.—**London.**—ROAD REPAIRS, ETC.—The Metropolitan Asylums Board invite tenders for road repairing and tar paving work at the Western Fever Hospital, Fulham. See advertisement in this issue for further particulars.

APRIL 7.—**Saddleworth.**—SEWAGE-DISPOSAL WORKS.—The U.D.C. invite tenders for the construction of extensions and alterations to the Dobcross Outfall Works. Drawings, etc., prepared by the Engineer, may be seen, and information obtained, at the Council Offices, Uppermill, Saddleworth. Form of tender, etc., may be obtained from the Engineer, Mr. Rupert Kilner, A.M.Inst.C.E., Malta House, Lees, near Oldham, on payment of a deposit of 3*l.*

APRIL 8.—**Hucknall Torkard.**—SEWAGE WORKS.—The U.D.C. invite tenders for sewerage and sewage disposal works. Plans may be seen at the office of the engineers, Messrs. Sands & Walker, Milton-chambers, Nottingham, and copies of conditions, etc., can be obtained on deposit of 3*l.* 3s.

APRIL 11.—**Brighouse.**—REPAVING OF BIRDS ROYD-LANE.—The Brighouse Corporation invite tenders for the repaving of a portion of the above street with granite setts on concrete. Plans, etc., may be seen, and specification, etc., obtained, upon application to Mr. S. S. Haywood, Borough Engineer and Surveyor, Municipal Offices, Brighouse.

APRIL 12.—**Maldens.**—MAKING-UP, ETC.—The Maldens and Coombe U.D.C. invite tenders for (1) making-up the carriageway, kerbing, etc., in Albany-road, New Malden; (2) paving the footways of Albany-road, New Malden. The drawings may be seen, and conditions of contract, etc., obtained, on application to the Engineer and Surveyor, Mr. Reginald H. Jeffes, A.M.Inst.C.E., at the Council Offices, New Malden, upon payment of a deposit of 4*l.* 4s. for Contract No. 1, and 2*l.* 2s. for Contract No. 2 (by cheque payable to the Council).

APRIL 14.—**Westminster.**—PAVING WORK.—The Westminster City Council invite tenders for the execution of paving work. Forms of conditions, etc., can be obtained on application at the Town Clerk's office, Westminster City Hall, Charing Cross-road, W.C.

APRIL 16.—**Rochdale.**—RESERVOIR.—The Corporation of Rochdale invite tenders for the construction of a covered service reservoir, Thornham New-road. The drawings may be seen, and a copy of the specification, etc., may be obtained (on payment of 5*l.* 5s.), at the offices of Messrs. H. Rofe & Son, civil engineers, 8, Victoria-street, Westminster, S.W., and Oxford-chambers, Victoria-square, Leeds.

APRIL 20.—**Horsham Southwater.**—TAR PAVING.—West Sussex Local Education Authority invite tenders for the tar paving of the playgrounds and incidental work at the Horsham Southwater Council School. Specifications, etc., will be forwarded on

ROADS, etc.—*continued.*

The date given at the commencement of each paragraph is the latest date when the tender, or the names of those willing to submit tenders, may be sent in.

application to Mr. Lionel Thompson Secretary Education Offices, Horsham, Sussex.

APRIL 20.—**Littleover.**—SEWERAGE.—Shardlow R.D.C. invite tenders for the construction of about five miles of sewers, together with manholes, etc., in the Parish of Littleover, near Derby. Plans, etc., may be seen at the offices of the engineers, Messrs. Shaw, Son, & Fuller, The College, All Saints', Derby, and form, etc., obtained, on payment of the sum of 1l. 1s.

NO DATE.—**East Heddon.**—WATER PIPE.—The Small Holdings and Allotments Committee of the County of Northumberland invite tenders for supplying and laying about three miles of wrought-iron water pipe. Forms of tender, etc., can be obtained from Mr. Arthur P. Ker, County Land Agent, the Moot Hall, Newcastle.

STONES, MATERIAL, AND STORES.

MARCH 28.—**East Grinstead.**—MATERIALS.—East Grinstead U.D.C. invite tenders for granite, etc. Forms of tender, etc., may be obtained from Mr. W. E. Woollam, Engineer and Surveyor to the Council, Council Offices, London-road, East Grinstead.

MARCH 28.—**Hexham.**—DISINFECTANTS.—Hexham R.D.C. invite tenders for the supply of disinfectants, etc. Terms of tender, etc., may be obtained from Mr. G. H. Nicholson, Clerk, office, Midland Bank-chambers, Hexham.

MARCH 28.—**Kidderminster.**—MATERIALS.—The R.D.C. invite tenders for road materials for the year. Specification, etc., may be obtained from Mr. G. J. Shepherd, surveyor, 85, Chester-road, Kidderminster.

MARCH 28.—**Melton Mowbray.**—GRANITE, ETC.—The R.D.C. invite tenders for the supply, during the year, of broken granite and broken slag. Forms of tender may be obtained at office of Mr. Arthur H. Marsh, Clerk.

MARCH 28.—**Rosslynlee.**—MATERIALS.—Mid-Lothian and Peebles District Asylum Committee, Rosslynlee, invite tenders for plumbers' material, electric fittings, etc. Forms of tender can be had by applying to the Treasurer, 19, Heriot-row, Edinburgh.

MARCH 29.—**Burnley.**—MATERIALS.—The Gas Committee invite tenders for requirements during twelve months. Specifications, etc., may be obtained from Mr. Jno. P. Leather, Gas Engineer, Gas Works, Burnley.

MARCH 29.—**Govan.**—MATERIALS.—The Electricity Committee of the Burgh of Govan invite tenders for the supply of stores for twelve months. Forms of tender to be obtained from Mr. T. C. Parsons, Burgh Electrical Engineer, Helen-street, Govan.

MARCH 29.—**Great Yarmouth.**—CEMENT.—Tenders are invited for White's cement, to be delivered on craft at Fishers Quay or Bridge Quay, Great Yarmouth, for Burgh Castle Drainage Board. Forms of application can be obtained from the Clerk, at 3, South-quay, Great Yarmouth.

MARCH 29.—**Great Yarmouth.**—ROAD MATERIALS.—Guernsey granite, basalt, quartzite, penlee, or other stone, granite setts, broken flint, coarse gravel, etc. Specifications, form of tender, etc., can be obtained at office of Mr. J. Wm. Cockrill, M.Inst.C.E., Borough Surveyor, Town Hall, Great Yarmouth.

MARCH 29.—**Oystermouth.**—MATERIALS, ETC.—The U.D.C. invite tenders for supply and delivery of road material, etc. Particulars, etc., from the Surveyor of the Council.

MARCH 30.—**Belfast.**—TIMBER.—The Belfast Harbour Commissioners invite tenders for the supply of about 270 pieces of Riga timber, particulars of which may be obtained from the Harbour Engineer, Mr. W. Redfern Kelly, M.Inst.C.E.

MARCH 30.—**Rochdale.**—MATERIALS.—The Gas and Electricity Committee invite tenders for the supply and delivery of goods. Forms of tender may be had on application to Mr. T. Banbury Ball, the Manager, at the Gas Works, Dane-street.

MARCH 30.—**Windlesham.**—MATERIALS.—The U.D.C. of Windlesham invite tenders for the supply of road materials. Tender forms may be obtained of the Surveyor at the Council Offices, Bagshot.

MARCH 31.—**Cheadle.**—MATERIALS.—The U.D.C. of Cheadle and Gatley invite tenders for the supply and delivery of materials and for the manual and team labour in paving and jobbing repairs on highways for the year. Specifications, etc., may be obtained on application to Mr. Edward Sykes, C.E., Surveyor to the Council.

MARCH 31.—**Great Yarmouth.**—MATERIALS.—Great Yarmouth Port and Haven Commissioners invite tenders for the supply of painters' and plumbers' materials and oils, etc. Forms of tender, etc., can be obtained on application at office of Mr. J. Tolver Waters, Clerk, 2, Quay, Great Yarmouth, accompanied by a stamped and directed envelope.

APRIL 2.—**Middleton.**—DISINFECTING POWDER.—The Corporation invite tenders for disinfecting powder for the year. Further particulars, etc., may be obtained from Mr. C. H. Norton, Sanitary Inspector, Corporation-street, Middleton.

APRIL 2.—**Sherston, Malmesbury.**—STONE.—Malmesbury R.D.C. invite tenders for the supply of about 700 yds. of block limestone. Forms of tender can be obtained from the Highway Surveyor, Mr. W. H. Lintern, Malmesbury.

APRIL 2.—**Truro.**—ANNUAL CONTRACTS.—The City Council invite tenders for the supply of horse hire and materials for the year. Conditions, specifications, etc., can be obtained on application at the office of Mr. Fredk. A. Barnes, A.M.Inst.C.E., City Engineer and Surveyor, Municipal Buildings, Truro.

APRIL 4.—**Glasgow.**—MATERIALS.—The Corporation invite tenders for materials, etc. Specification, etc., may be obtained on application to Mr. Jas. Dalrymple, General Manager, 46, Bath-street, Glasgow.

APRIL 4.—**Manchester.**—PIPES.—The Corporation Waterworks Committee invite tenders for the supply of cast-iron hydraulic (high pressure) pipes and special castings, required during twelve months. Particulars may be obtained on application to the Secretary, Waterworks Offices, Town Hall, Manchester, on payment of 10s.

APRIL 4.—**Manchester.**—STORES.—Manchester Corporation Waterworks Committee invite tenders for the supply of articles and materials. Particulars may be obtained on application to the Secretary, Waterworks Offices, Town Hall, Manchester.

APRIL 4.—**Manchester.**—STORES.—The Directors of the Lancashire and Yorkshire Railway Company invite tenders for the supply of articles during twelve months. Further particulars and forms of tender may be obtained on application to Mr. Waring, Stores Department, Osborne-street, Manchester.

APRIL 4.—**Otley.**—BRUSHES AND PITCH.—The U.D.C. invite tenders for the supply of brushes and pitch for the year. Specification, etc., may be had at the office of Mr. C. F. Hodgson, Surveyor, Council Offices, North-parade, Otley.

APRIL 4.—**South Stoneham.**—GRANITE AND FLINTS.—The R.D.C. invite tenders for the supply of Cherbourg quartzite or British macadam and flint. Forms of tender may be obtained at office of Mr. E. T. Westlake, Clerk, 20, Portland-street, Southampton, or of the District Surveyor, Mr. W. J. Potter, "Glenroy," Portswood, Southampton.

APRIL 4.—**Stocksbridge.**—MATERIALS.—The Stocksbridge U.D.C. invite tenders for supply of highway material and tools. Particulars, etc., to be had from Mr. J. Marsden, Clerk to the Council, Council Offices, Stocksbridge.

APRIL 5.—**Maldon.**—MATERIALS.—The R.D.C. invite tenders for the supply of materials for the year. Form of tender may be obtained from Mr. Edgar J. Ennals, surveyor, 6, Market-hill, Maldon, Essex.

APRIL 5.—**Southampton.**—STORES, ETC.—The Corporation invite tenders for the supply of stores, etc., required in the Borough Engineer's Department. Specification, etc., may be obtained at the Borough Engineer's Office.

APRIL 6.—**Lydd.**—ROAD MATERIAL.—The T.C. invite tenders for the supply and delivery of Rhenish columnar basalt and chippings. No tender form supplied. Mr. Thomas Kettle, Borough Surveyor, Lydd.

APRIL 6.—**Partick.**—STORES.—Partick T.C. invite tenders for the supply of engine-room stores, cables, cable jointing requirements, etc. Schedules can be obtained at the Burgh Electrical Engineer's office, Mauldslie-street, Partick.

APRIL 6.—**Sunderland.**—WORKS AND MATERIALS.—The Corporation invite tenders for works and materials in the Borough for one year. Forms of tender obtained on application to the Borough Engineer, Town Hall, Fawcett-street.

APRIL 7.—**Eastbourne.**—MATERIALS.—The R.D.C. invite tenders for stone, flints, beach, and cartage. Forms of tender may be obtained from Mr. T. E. Varley Kirtlan, Clerk to the Council, 92, Terminus-road, Eastbourne, or Mr. C. M. Carter, "Mount Sorrel," Hampden Park, near Eastbourne, on forwarding stamped addressed foolscap envelope.

APRIL 9.—**Mottram-in-Longdendale.**—ROCK SETTS.—The U.D.C. invite tenders for the supply of rock setts. Full particulars can be obtained from Mr. S. Hudson, surveyor, Mottram.

APRIL 14.—**Houghton.**—MATERIALS.—The R.D.C. of Houghton-le-Spring invite tenders for supplying machine-broken blastfurnace slag road metal, slag riddlings, and blue limestone. Full particulars, etc., may be obtained from the Surveyor of the Council, Mr. D. Balfour, M.Inst.C.E., Houghton-le-Spring, S.O.

Public Appointment.

Nature of Appointment.	By whom Advertised.	Salary.	Application to be in
VALUER AND SURVEYOR, IRELAND	Civil Service Commission	See advertisement in this issue	April 21

Auction Sales.

Nature and Place of Sale.	By whom Offered.	Date of Sale.
FREEHOLD PROPERTY, CLAPHAM COMMON—At the Mart	Edwin Fox, Bousfield, Burnetts, & Baddeley	April 13
FREEHOLD PROPERTY, STREATHAM COMMON—At the Mart	Edwin Fox, Bousfield, Burnetts, & Baddeley	April 13
FREEHOLD ESTATE, ETC., PALMER'S GREEN, N.—At the Mart	Driver, Jonas, & Co.	April 19
MCHRY., PLANT, STK., ETC., BLDERS., W'MINSTER BDGE.-RD., S.E.—On the Premises	Fuller, Horsey, Sons, & Cassell	April 20
FREEHOLD LAND, CLACTON-ON-SEA—At the Mart	Farebrother, Ellis, Egerton, Breach, & Co.	April 21
FREEHOLD BUILDING LAND, HAMPTON—At the Mart	Messrs. Nicholas	April 25
FREEHOLD LAND, BOW—At the Mart	C. C. & T. Moore	No Date.

MISCELLANEOUS—*Continued from page 364.*

Romsey Abbey, by grant of Edgar.——The two adjoining estates of Wretham and Breccles Hall, nearly 10,000 acres in all, near Thetford, contain ruins of Wretham Abbey and the mansion built in 1469 by Sir Edward Woodhouse, where had been the home, *temp.* Edward I., of John de Breccles; it was bought in 1599 by Sir Richard Gardiner, Chief Justice and Viceroy of Ireland, and has been repaired by Mr. Detmar Blow.——The late Mr. Alfred Beit's mansion, No. 26, Park-lane, of which we recently gave a brief description, was withdrawn from sale a few days ago after a bid of 44,000*l.*; the lease, held directly from the Duke of Westminster, has seventy-five years unexpired, at a ground rent of 1,150*l.* per annum.——Amington Hall, near Tamworth, is notable for having continued in the family of its present owner, Colonel Repington, since five centuries ago, when Sir William Clinton sold it to William Repington.——No. 4, Maids-of-Honour-row, Richmond, was the home of J. Heidegger, conductor of operas and masquerades, and Master of the Revels to George I. and George II.

EASTERN HOSPITAL, HOMERTON.

Mr. Louis Jacob asks us to mention that he has been appointed quantity surveyor for this building, but is not the architect. Under the impression that he is the architect, he has been troubled with many circulars from manufacturers, etc.

GOVERNMENT CONTRACTS.

The following tenders have been accepted by Government Departments named:—Admiralty, Director of Works Department, works services—Caissons, No. 2, floating, for new lock, H. M. Dockyard, Portsmouth, Messrs. Workman, Clark, & Co., Ltd., Spencer Basin, Belfast; erection of superstructure of the extension of offices at H.M. Naval Depôt, Portland, Messrs. Wakeham Brothers, Friary-road, Tothill, Plymouth; new approach road, fencing, etc., at H.M. Naval Ordnance Establishment, Crombie, Mr. John Martin, 10, Bridge-street, Dunfermline. War Office, works services—Alterations and additions to messes in "B" and "D" lines, Bulford Camp, Salisbury Plain, Messrs. Millet & Musselwhite, Castle-street, Salisbury; alterations to and refitting of annexes, etc., Royal Victoria Hospital, Netley, Messrs. Billet & Musselwhite, Castle-street, Salisbury; asphalt work (running contract), Messrs. Engert & Rolfe, Ltd., Poplar, E.; erection of mobilisation storehouse, Grand Depôt Barracks, Woolwich, Yorkshire Hennebique Contracting Company, Ltd., Viaduct Works, Leeds; erection of No. 1 half-company barrack block, Reading, Messrs. G. S. Lewis & Brothers, Castle-street, Reading; erection of nursing staff's quarters, Military Families Hospital, Devonport, Mr. Jas. Crockerell, Richmond-walk, Devonport; erection of troop stables, etc., Fulwood Barracks, Preston, Mr. R. Thompson, Dalton-square, Lancaster; regrade and remetal roads and parades, Norwich, Mr. E. J. Edwards,

Plumstead-road, Norwich. India Office, Store Department—Bridgework, Patent Shaft and Axletree Company, Wednesbury. Office of Works, builders' work—Greenock Labour Exchange, adaptation, Messrs. J. Baxter & Sons, 20, Catherine-street, Glasgow; alterations, Halifax Post Office, Messrs. Pickles Brothers, 63, Ripon-street, Harkinson-lane, Halifax; enlargement, Wednesbury Port Office, Messrs. W. B. & F. T. Archer, 198, Albert-road, Handsworth, Birmingham; tiling, Admiralty, marble and tile paving, Mosaic, Marble, and Tile Company, Ltd., 27, Gillingham-road, Cricklewood, N.W.; new Western District Post Office, wall tiling, Messrs. Carter & Co., Ltd., 29, Albert-embankment, S.E.; fittings, Manchester, Newton-street Post Office fittings, third contract, Messrs. Richard Stone & Sons, Ltd., Crown Works, Wellington, Salop; Sheffield new Post Office, fittings, first contract, the Educational Supply Association, Ltd., 42, Holborn Viaduct, E.C. Prison Commission—Extension of reception building at Holloway Prison, Messrs. L. Whitehead & Co., Ltd., Portland Works, Portland-place, Clapham-road, S.W.

Patents.

APPLICATIONS PUBLISHED.*

27,962 of 1908.—William John Edney: Permanent centring for the casting of concrete constructions.

364 of 1909.—Edward George Paul Bousfield, Louis Schulte, and Metal Finishers, Ltd.: Manufacture of tiles, bricks, pottery, and the like.

4,106 of 1909.—Samuel Elliot: Revolving doors.

4,807 of 1909.—Leslie & Co., Ltd., and Herbert Kempton Dyson: System of reinforced concrete floor construction.

10,994 of 1909.—Francis Foster Thomas Marrable: Combined vertical and horizontal steel or iron reinforcement for brick walls, arches, piers, and the like.

13,936 of 1909.—Edmund H. Lunken: Window construction.

12,603 of 1909.—John Templeton: Chimney cowl.

16,031 of 1909.—Peter McCallum: Construction of drain traps.

22,415 of 1909.—Alois Zboril: Building block or slab.

24,295 of 1909.—Percy Richard Julius Willis (John James Halladay): Means for preventing rattling of windows and sliding doors.

26,153 of 1909.—Theodore McKenna (William Ferdinand Tyler): Window fastening.

26,429 of 1909.—Fried Krupp Aktiengesellschaft: Telescopic ladders.

26,609 of 1909.—Hedwig Schrader: Appliance for masking sloping ceilings in garrets and the like.

26,767 of 1909.—Tonks, Ltd., and Walter Sparks: Window-sash fasteners.

26,708 of 1909.—Sidney Weiss Mitchell: Manufacture of handles for doors.

27,999 of 1909.—Theodor Frey: Manufacture of hollow tapering reinforced concrete pillars.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

March 11.—By SEXTON & GRIMWADE (at Lincoln).

North Hykeham, Lincs.—Part of Hykeham Hall estate, 140 a. 3 r. 37 p., f. £5,965

By R. W. DENYER & Co. (at Tunbridge Wells).

Tunbridge Wells.—Linden-pk., Brakiswood, u.t. 74 yrs., g.r. 10*l.*, y.r. 120*l.* 1,470

March 14.—By DREWATT & WATSON (at Newbury).

Newbury, Berks.—23 to 35, Shaw-cres., f., gross rental 196*l.* 19s. 1,700

2 and 4, Waterloo-ter. and stable 450

By BRACKETT & SONS.

Tunbridge Wells.—30, Broadwater-down, and 2¼ a., u.t. 49½ yrs., g.r. 41*l.*, p. 3,000

By PROTHEROE & MORRIS.

Ashingdon, Essex.—Harrogate Farm, 22¾ a., f., p. 1,000

March 15.—By HENRY CHAPMAN & Co.

Strand.—38, Wellington-st. (s.), f., y.r. 130*l.* 4,500

By MAY & PHILPOT.

Tulse Hill.—No. 79, u.t. 31 yrs., g.r. 12*l.* 10s., y.r. 80*l.* 570

Walthamstow.—33, The Drive, u.t. 53 yrs., g.r. 8*l.* 8s., e.r. 35*l.* 170

By NOYS & HOWES.

Sydenham.—17, Tredown-rd., f., p. 550

By WHEELER & WHEELER.

Muswell Hill.—Barnard-hill, f.g.r. 6*l.* 10s., reversion in 88 yrs. 142

6, Donovan-av., u.t. 90 yrs., g.r. 12*l.*, y.r. 65*l.* 630

By GEORGE LOVEITT & SONS.

Coventry.—52 and 53, Cross Cheaping (s.), f. .. 3,900

49, North-st., f., w.r. 16*l.* 18s. 240

16 and 17, Brewery-st., and 1 to 4, Court Seven, f., w.r. 55*l.* 5s. 303

March 16.—By R. CHEKE & Co.

Walthamstow.—Chatham-rd., f.g. rents 42*l.*, reversion in 90 yrs. £870

King Edward-rd., f.g. rents 42*l.*, reversion in 90 yrs. 845

Forest Gate.—Wellington-rd., f.g.r. 7*l.*, reversion in 46 yrs. 165

Plaistow.—14, High-st. (s.), f., y.r. 50*l.* 565

By FRANK JOLLY & JAMES.

Hackney.—80, 82, and 84, Amhurst-rd. (s.), u.t. 42½ yrs., g.r. 8*l.*, y.r. 150*l.* 1,550

By DOUGLAS YOUNG & Co.

West Norwood.—St. Louis-rd., f.g.r. 7*l.*, reversion in 83½ yrs. 165

Thurleston-rd., f.g.r. 8*l.*, reversion in 81 yrs. .. 175

Hornsey.—Lausanne-rd., f.g. rents 25*l.* 16s., reversions in 76 yrs. 635

Raynes Park.—Bijou Villas, f.g. rents 17*l.* 10s., reversion in 88 yrs. 320

March 17.—By H. J. BLISS & SONS.

Dalston.—38 and 40, Middleton-rd., u.t. 29 yrs., g.r. 9*l.*, y.r. 64*l.* 300

Hackney.—39, North-st., f., w.r. 18*l.* 4s. 150

32, Brunswick-st., f., w.r. 36*l.* 8s. 240

Dulwich.—Friern-rd., f.g. rents 13*l.*, reversion in 64 yrs. 320

By BUNCH & DUKE.

Dalston.—66, Pownall-rd., u.t. 33 yrs., g.r. 3*l.* 15s., y.r. 32*l.* 200

70, 113, and 117, Pownall-rd., u.t. 33 yrs., g.r. 11*l.* 15s., w.r. 124*l.* 16s. 620

46, Brougham-rd., u.t. 35 yrs., g.r. 3*l.* 10s., y.r. 28*l.* 200

5 and 6, Ipswich-rd., u.t. 35 yrs., g.r. 7*l.*, w.r. 72*l.* 16s. 450

41, Regents-row, u.t. 33 yrs., g.r 3*l.*, w.r. 44*l.* 4s. 145

Homerton.—17, 59, and 61, Ballance-rd., u.t. 49 yrs., g.r. 12*l.*, w.r. 101*l.* 8s. 495

Hackney.—10, Queen Ann-rd., u.t. 35 yrs., g.r. 3*l.* 10s., y.r. 28*l.* 220

By NEWBON & SHEPHARD.

Notting Hill.—102, Portobello-rd., u.t 33½ yrs., g.r. 6*l.*, e.r. 32*l.* 145

Highgate.—37, Bismark-rd., u.t. 78½ yrs., g.r. 6*l.* 10s., y.r. 35*l.* 365

Walthamstow.—59 and 61, Northcote-rd., u.t. 71½ yrs., g.r. 7*l.*, w.r. 46*l.* 16s. 195

Bowes Park.—27, Maidstone-rd., three plots of land, etc., f., y.r. 48*l.* and p. 1,180

Barnsbury.—20 and 21, Vittoria-rd., f., w.r. 62*l.* 8s. 400

Stoke Newington.—100, Carysfort-rd., u.t. 81 yrs., g.r. 7*l.* 12s. 6d., y r. 36*l.* 220

Goldsmith-sq., f.g. rents 18*l.*, reversion in 41 yrs. 470

Cowper-rd., f.g. rents 40*l.*, reversion in 41 yrs.. 1,010

Shakespeare-rd., f.g. rents 8*l.*, reversion in 41 yrs. 225

Canonbury.—St. Pauls-rd., i.g. rents 26*l.*, u.t. 16 yrs., g.r. 16*l.* 120

4, St. Pauls-rd.; 9, 10, and 11, Compton-st., and i.g.r. 60*l.* 8s., u.t. 16 yrs., g.r. 15*l.* 12s., y.r. 140*l.* 860

3, Newington Green-rd., u.t. 16 yrs., g.r. 5*l.* 10s., y.r. 38*l.* 100

36, 56, 58, 60, 62, and 64, St. Pauls-rd., u.t. 15½ yrs., g.r., etc., 57*l.* 11s., y.r. 239*l.* 10s.. 495

Kingsland-road.—Nos. 431 and 433, also i.g.r. 6*l.*, u.t. 16 yrs., g.r. 18*l.*, y.r. 82*l.* 200

By PRICKETT & ELLIS.

Highgate.—19, Hampstead-la., f., p. 820

WILLIAM STEVENS.

Stoke Newington.—13 and 15, Cowper-rd., u.t. 42 yrs., g.r. 8*l.*, e.r. 60*l.* 250

By STIMSON & SONS.

Forest Gate.—52 and 58 (even), Glenparke-rd., u.t. 81½ yrs., g.r. 20*l.*, w r. 114*l.* 8s. 600

Fulham.—3 to 11 (odd), Cambria-st., u.t. 43 yrs., g.r. 20*l.* w.r. 196*l.* 6s. 525

Walworth-road.—No. 240 (s.), u.t. 23½ yrs., g.r. 33*l.* 15s., y.r. 100*l.* 370

Walworth.—176, 178, and 180, Westmoreland-rd., u.t. 42 yrs., g.r. 12*l.* 15s., w.r. 157*l.* 6s.. 655

Camberwell.—113, Southampton-st. (s.), f., w.r. 31*l.* 4s. 250

By JOSEPH STOWER.

Wimbledon.—Trinity-rd., f.g. rents 42*l.*, reversion in 75 yrs. 950

Camberwell.—85, Southampton-st. (s.), f., y.r. 30*l.* 320

87, Southampton-st. (s.), f., y.r. 24*l.* 255

By ATHAWES, SON, & Co. (at Acton).

Acton.—9, Emanuel-av., u.t. 85 yrs., g.r. 10*l.*, p. 460

March 18.—By CHAS. CANEY.

Camberwell.—9, Grove-pk., f., p. 1,012

7 and 8, Wilson-rd., u.t. 45 yrs., g.r. 6*l.*, p. .. 495

Lambeth.—13 and 14, Anderson's-walk, f., w.r. 43*l.* 15s. 4d. 375

Brixton.—35, Trinity-sq., u.t. 17 yrs., g.r. 3*l.* 12s., y.r. 3*l.* 120

By PERCIVAL HODSON.

Finsbury Park.—482, Seven Sisters-rd., u.t 55 yrs., g.r. 21*l.* p. 600

Palmers Green.—14, Palmerston-cres., f., e.r. 40*l.* 450

By MARK LIELL & SON.

Plaistow.—Balaam-st., The Laurels, f., p. 1,500

Herbert-st., manufacturing premises, f., y.r. 10*l.* 1,525

Balaam-st., piece of land, area 26,500 ft., f. .. 275

51 to 59 (odd), Chesterton-rd., f., w r. 140*l.* 8s. 910

5 to 11 (odd), Liddon-rd., f., w.r. 104*l.* 800

Dalston.—75, Shrubland-gr., u.t. 38 yrs., g.r. 5*l.*, e.r. 33*l.* 260

Manor Park.—5, Cumberland-rd., u.t. 70 yrs., g.r. 3*l.* 18s., y.r. 20*l.* 180

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; p. for possession; e.r. for estimated rental; w.r. for weekly rental; q r. for quarterly rental; y.r. for yearly rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; la. for lane; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gdns. for gardens; yd. for yard; gr. for grove; b.h. for beerhouse; p.h. for public-house; o. for offices; s. for shops; ct. for court.

* All these applications are in the stage in which opposition to the grant of a patent upon them can be made.

PRICES CURRENT OF MATERIALS.

**** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

Per 1000 Alongside, in River.

	£ s. d.
Best Stocks	1 8 0

Per 1000, Delivered at Railway Depôt.

	£ s. d.		£ s. d.
Picked Stocks for Facings	2 10 0	D'ble Stretchers	16 7 6
Flettons	1 6 0	Double Headers	13 7 6
Best Fareham Red	3 12 0	One Side and two Ends	17 7 6
Best Red Pressed Ruabon Facing	5 0 0	Two Sides and one End	18 7 6
Best Blue Pressed Staffordshire	3 15 0	Splays & Squints	15 17 6
Do. Bullnose	4 0 0	Best Dipped Salt Glzd Str'tch'rs	10 17 6
Best Stourbridge Fire Bricks	3 14 0	Headers	10 7 6
GLAZED BRICKS.		Quoins, Bullnose, and Flats	14 7 6
Best White and Ivory Glazed Stretchers	10 17 6	D bl Stretchers	16 7 6
Headers	10 7 6	Double Headers	13 7 6
Quoins, Bullnose, and Flats	14 7 6	One side and two Ends	17 7 6
		Two Sides and one End	18 7 6
		Splays & Squints	15 17 6

Second Quality White and Dipped Salt Glazed, £1 5s. per 1000 less than best.

	s. d.	
Thames and Pit Sand	6	6 per yard delivered.
Thames Ballast	5	0 ,, ,,
Best Portland Cement	28	0 per ton, ,,
Best Ground Blue Lias Lime	19	0 ,, ,,

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime ..... 11s. 6d. per yard, delivered.
Stourbridge Fireclay in sacks 27s. 0d. per ton at rly. dpt.

STONE.

Per Ft. Cube.

	s. d.
BATH STONE—delivered on road waggons, Paddington Depôt	1 6½
Do. do. delivered on road waggons, Nine Elms Depôt	1 8½
PORTLAND STONE (20 ft. average)—	
Brown Whitbed, delivered on road waggons, Paddington Depôt, Nine Elms Depôt, or Pimlico Wharf	2 1
White Basebed, delivered on road waggons, Paddington Depôt, Nine Elms Depôt, or Pimlico Wharf	2 2½

Per Ft. Cube, Delivered at Railway Depôt.

	s. d.		s. d.
Ancaster in blocks	1 10	Red Corsehill in blocks	2 2
Beer in blocks	1 6	Closeburn Red Freestone	2 0
Greenshill in blocks	1 10	Red Mansfield Freestone	2 4
Darley Dale in blocks	2 4		

YORK STONE—*Robin Hood Quality.* s. d.
Scappled random blocks 2 10

Per Ft. Super., Delivered at Railway Depôt.

3 in. sawn two sides landings to sizes (under 40 ft. super.)	2 3
6 in. rubbed two sides ditto, ditto	2 6
3 in. sawn two sides slabs (random sizes)	0 11½
2 in. to 2½ in. sawn one side slabs (random sizes)	0 7½
1½ in. to 2 in. ditto, ditto	0 6

Per Ft. Cube, Delivered at Railway Depôt.

Scappled random blocks	3 0

Per Ft. Super., Delivered at Railway Depôt.

6 in. sawn two sides landings to sizes (under 40 ft. super.)	2 8
6 in. rubbed two sides ditto	3 0
3 in. sawn two sides slabs (random sizes)	1 2
2 in. self-faced random flags	0 5

SLATES.

Per 1000 of 1200 at Railway Depôt.

In. In.	£ s. d.	In. In.	£ s. d.
20×10 best blue Bangor	13 2 6	20×10best Eur'ka unfading green	15 17 6
20×12 ditto	13 17 6	20×12 ditto	18 7 6
20×10 1st quality ditto	13 0 0	18×10 ditto	13 5 0
20×12 ditto	13 15 0	16×8 ditto	10 5 0
16×8 ditto	7 5 0	20×10permanent green	11 12 6
22×10 best blue Portmadoc	12 12 6	18×10 ditto	9 12 6
16×8 ditto	6 12 6	14×8 ditto	6 12 6

TILES.

At Railway Depôt.

	s. d.		s. d.
Best plain red roofing (per 1000)	42 0	Best "Rosemary" brand plain (per 100)	48 0
Hip and Valley per doz.)	3 7	Best Ornamental (per 1000)	50 0
Best Broseley (per 1000)	50 0	Hip (per doz.)	4 0
Do. Ornamental (per 1000)	52 6	Valley (per doz.)	3 8
Hip and Valley (per doz.)	4 0	Best "Hartshill" brand, plain sand-faced (per 100)	50 0
Best Ruabon red, brown, or brindled (Edw'ds) (per 1000)	57 6	Do. pressed (per 1000)	47 6
Do. Ornamental (per 1000)	60 0	Do. Ornamental (per 1000)	50 0
Hip (per doz.)	4 0	Hip (per doz.)	4 0
Valley (per doz.)	3 0	Valley (per doz.)	3 6
Best Red or Mottled Staffordshire do. (Peakes) (per 1000)	51 9	Staffords. (Hanley) Reds or Brindled (per 1000)	42 6
Do. Ornamental do. (per 1000)	54 6	Hand-made sand-faced (per 1000)	45 0
Hip (per doz.)	4 1	Hip (per doz.)	4 0
Valley (per doz.	3 8	Valley (per doz.)	3 6

WOOD.

Building Wood.	At per standard. £ s. d.	£ s. d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	14 0 0	15 10 0
Deals: best 3 by 9	13 10 0	14 10 0
Battens: best 2½ in. by 7 in. and 8 in., and 3 in. by 7 in. and 8 in.	11 10 0	12 10 0
Battens: best 2½ by 6 and 3 by 6	0 10 0	less than 7 in. and 8 in.
Deals: seconds	1 0 0	less than best.
Battens: seconds	0 10 0	" "
2 in. by 4 in. and 2 in. by 6 in.	9 10 0	10 10 0
2 in. by 4½ in. and 2 in. by 5 in.	9 0 0	10 0 0
Foreign Sawn Boards— 1 in. and 1¼ in. by 7 in.	0 10 0	more than battens.
¼ in.	1 0 0	"

	At per load of 50 ft. £ s. d.	£ s. d.
Fir timber: best middling Danzig or Memel (average specification)	5 0 0	5 10 0
Seconds	4 10 0	5 0 0
Small timber (8 in. to 10 in.)	3 17 6	4 0 0
Small timber (6 in. to 8 in.)	3 5 0	3 10 0
Swedish balks	2 12 6	3 0 0
Pitch-pine timber (30 ft. average)	4 10 0	5 5 0

Joiners' Wood.	At per standard. £ s. d.	£ s. d.
White Sea: first yellow deals, 3 in. by 11 in.	24 10 0	25 10 0
3 in. by 9 in.	22 10 0	23 10 0
Battens 2½ in. and 3 in. by 7 in.	17 0 0	18 0 0
Second yellow deals, 3in. by 11 in.	19 0 0	20 0 0
" " 3 in. by 9 in.	18 0 0	19 10 0
Battens, 2½ in. and 3 in. by 7 in.	14 0 0	15 0 0
Third yellow deals, 3 in. by 11 in. and 9 in.	14 0 0	15 0 0
Battens 2½ in. and 3 in. by 7 in.	1 10 0	12 10 0
Petersburg: first yellow deals, 3 in. by 11 in.	21 10 0	22 10 0
Do. 3 in. by 9 in.	18 10 0	19 10 0
Battens	14 0 0	15 0 0
Second yellow deals, 3 in. by 11 in.	16 10 0	17 10 0
Do. 3 in. by 9 in.	15 0 0	16 0 0
Battens	11 10 0	12 10 0
Third yellow deals, 3 in. by 11 in.	13 10 0	14 10 0
Do. 3 in. by 9 in.	13 0 0	14 0 0
Battens	10 10 0	11 0 0
White Sea and Petersburg— First white deals, 3 in. by 11 in.	15 0 0	16 0 0
" " 3 in. by 9 in.	14 0 0	14 10 0
Battens	11 10 0	12 10 0
Second white deals, 3 in. by 11 in.	14 0 0	15 0 0
" " 3 in. by 9 in.	13 0 0	14 0 0
Battens	10 10 0	11 0 0
Pitch-pine: deals	19 0 0	21 0 0
Under 2 in. thick extra	0 10 0	1 0 0
Yellow pine—First, regular sizes	44 0 0	upwards.
Oddments	32 0 0	"
Seconds, regular sizes	33 0 0	"
Oddments	28 0 0	"
Kauri Pine—Planks, per ft. cube	0 3 6	0 5 0
Danzig and Stettin Oak Logs— Large, per ft. cube	0 3 0	0 3 9
Small " "	0 2 6	0 2 6
Wainscot Oak Logs, per ft. cube	0 5 6	0 6 0
Dry Wainscot Oak, per ft. sup. as inch	0 0 8½	0 0 9½
½ in. do. do.	0 0 7	—
Dry Mahogany—Honduras, Tabasco, per ft. super. as inch	0 0 10	0 1 1
Selected, Figury, per ft. super as inch	0 1 6	0 2 6
Dry Walnut, American, per ft. super as inch	0 0 10	0 1 0
Teak, per load	18 0 0	22 0 0
American Whitewood Planks, per ft. cube	0 4 0	0 5 0

Prepared Flooring, etc.—	Per square.	
1 in. by 7 in. yellow, planed and shot	0 13 6	0 17 0
1 in. by 7 in. yellow, planed and matched	0 14 0	0 18 0
1¼ in. by 7 in. yellow, planed and matched	0 16 0	1 0 0
1 in. by 7 in. white, planed and shot	0 12 0	0 14 6
1 in. by 7 in. white, planed and matched	0 13 6	0 15 0
1¼ in. by 7 in. white, planed and matched	0 15 0	0 16 6
¼ in. by 7 in. yellow, matched and beaded or V-jointed brds.	0 11 0	0 13 6
1 in. by 7 in. " "	0 14 0	0 18 0
¼ in. by 7 in. white " "	0 10 0	0 11 6
1 in. by 7 in. " "	0 12 9	0 15 0

6 in. at 6d. to 9d. per square less than 7 in.

JOISTS, GIRDERS, &c.

	In London, or delivered Railway Vans, per ton. £ s. d.	£ s. d.
Rolled Steel Joists, ordinary sections	7 0 0	7 10 0
Compound Girders, ordinary sections	9 0 0	10 0 0
Steel Compound Stanchions	11 0 0	12 0 0
Angles, Tees, and Channels, ordinary sections	9 0 0	10 0 0
Pitch Plates	9 0 0	9 10 0
Cast Iron Columns and Stanchions including ordinary patterns	7 10 0	8 10 0

METALS.

	Per ton, in London. £ s. d.	£ s. d.
Iron— Common Bars	8 10 0	9 0 0
Staffordshire Crown Bars, good merchant quality	8 15 0	9 5 0
Staffordshire "Marked Bars"	10 10 0	—
Mild Steel Bars	8 15 0	9 5 0
Hoop Iron, basis price	9 5 0	9 10 0
" " Galvanised	17 0 0	—
("And upwards, according to size and gauge.)		
Sheet Iron Black— Ordinary sizes to 20 g.	9 15 0	—
" " 24 g.	10 15 0	—
" " 26 g.	12 5 0	—
Sheet Iron, Galvanised, flat, ordinary quality— Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.	15 0 0	—
Ordinary sizes to 22 g. and 24 g.	15 10 0	—
" " 26 g.	16 10 0	—

METALS (*continued*).

Iron (*continued*)—	Per ton, in London £ s. d.	£ s. d.
Sheet Iron, Galvanised, flat, best quality— Ordinary sizes to 20 g.	18 0 0	—
" " 22 g. and 24 g.	18 10 0	—
" " 26 g.	21 0 0	—
Galvanised Corrugated Sheets— Ordinary sizes, 6 ft. to 8 ft. 20 g.	14 10 0	—
" " 22 g. and 24 g.	14 15 0	—
" " 26 g.	16 5 0	—
Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. to 20 g. and thicker	12 0 0	—
Best Soft Steel Sheets, 22 g. & 24 g.	13 0 0	—
" " " 26 g.	15 0 0	—
Cut Nails, 3 in. to 6 in. (Under 3 in., usual trade extras.)	10 10 0	11 0 0

Lead, &c.	Per ton, in London. £ s. d.	£ s. d.
Lead—Sheet, English, 4lb. and up.	16 15 0	—
Pipe in coils	17 5 0	—
Soil pipe	20 5 0	—
Compo pipe	20 5 0	—
Zinc—Sheet—	In casks of 10 cwt.	
Vielle Montagne	28 12 6	—
Silesian	28 5 0	—
Zinc, in bundles, 1s. per cwt. extra.		
Copper— Strong Sheet per lb.	0 1 0	—
Thin " "	0 1 1	—
Copper nails "	0 0 10	—
Copper wire "	0 0 10	—
Brass— Strong Sheet "	0 0 11	—
Thin "	0 1 0	—
Tin—English Ingots "	0 1 6	—
Solder—Plumbers' "	0 0 7	—
Tinmen's "	0 0 9	—
Blowpipe "	0 1 0	—

ENGLISH SHEET GLASS IN CRATES OF STOCK SIZES.

Per Ft., Delivered.			
15 oz. thirds	2½d.	26 oz. fourths	3d.
" fourths	1½d.	32 oz. thirds	4½d
21 oz. thirds	2½d.	" fourths	4½d
" fourths	2½d.	Fluted Sheet, 15 oz.	3½d
26 oz. thirds	3½d.	" 21 oz.	4½d

ENGLISH ROLLED PLATE IN CRATES OF STOCK SIZES.

Per Ft., Delivered.			
⅛ Hartley's	2½d.	Figured, Oxford	
⅛ "	2½d.	Rolled, & "Oceanic"	
¼ "	2½d.	Glass, white	3½d.
		Ditto, tinted	5d.

Oils, &c.	£ s. d.
Raw Linseed Oil in pipes per gallon	0 2 11
" " " in barrels "	0 3 0
" " " in drums "	0 3 3
Boiled " " in barrels "	0 3 3
" " " in drums "	0 3 6
Turpentine in barrels "	0 3 6
" in drums "	0 3 8
Genuine Ground English White Lead per ton	20 10 0
Red Lead, Dry "	20 0 0
Best Linseed Oil Putty per cwt.	0 7 6
Stockholm Tar per barrel	1 12 0

Varnishes, &c.	Per gallon. £ s. d.
Fine Pale Oak Varnish	0 8 0
Pale Copal Oak	0 10 6
Superfine Pale Elastic Oak	0 12 6
Fine Extra Hard Church Oak	0 10 0
Superfine Hard-drying Oak, for seats of Churches	0 14 6
Fine Elastic Carriage	0 12 0
Superfine Pale Elastic Carriage	0 16 0
Fine Pale Maple	0 10 0
Finest Pale Durable Copal	0 18 0
Extra Pale French Oil	1 1 0
Eggshell Flating Varnish	0 18 0
White Pale Enamel	1 4 0
Extra Pale Paper	0 12 0
Best Japan Gold Size	0 10 6
Best Black Japan	0 16 0
Oak and Mahogany Stain	0 9 0
Brunswick Black	0 8 0
Berlin Black	0 16 0
Knotting	0 10 9
French and Brush Polish	0 10 6

TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 a.m. *on Thursday*. [N.B.—We cannot publish Tenders unless authenticated either by the architect or the building owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is stated, nor any list in which the lowest Tender is under 100*l.* unless in some exceptional cases and for special reasons.]

* Denotes *accepted*. † Denotes *provisionally accepted*.

BRIGHTON.—For eight double tenement houses, Tillstone-street, for the Borough Council:—

J. & W. Simmonds	£3,83[illegible]	A. M. Read	£3,478
R. Cook & Sons	3,775	W. J. McMillan, 13 and 14, Western-street, Brighton*	3,459
C. Hudson and W. J. Weeks	3,730		

CHADDERTON.—For private street works, Whitehead-street, Rose-street, Union-street etc., for the Urban District Council. Mr. A. W. Cox, Surveyor, Chadderton. Quantities by Surveyor:—

Whitehead-street.
G. Freeman & Sons, Hollinwood* .. £162 7 0
Rose-street.
G. Freeman & Sons, Hollinwood* .. 177 7 2
Union-street.
J. Brooks, Oldham* 375 7 6
Passage behind Old-lane and Spencer-street.
J. Brooks, Oldham* 93 10 0

DORCHESTER.—For the erection of a new school in Victoria Park, for the Education Committee:—
C. E. Slade, Acland-road, Dorchester* .. £3,880

DOVERCOURT (Essex).—For widening and sewering Franks-lane, for the Borough Council. Mr. H. Ditcham Borough Surveyor, Harwich:—
Wilson, Border, & Co., Romford* £990

DUDLEY.—For private street works, back street between Angerton-terrace and Coquet-street, for the Westslade Urban District Council. Mr. J. Dinsdale, Surveyor to the Council, Dudley:—

T. C. Starkey	£285 6 7	R. Black	£207 17 2
C. S. Busch	271 9 3	J. W. Henderson	202 10 0
F. H. Wegg	239 14 7	G. Armstrong	198 0 2
J. W. Robson	237 4 7	J. Coxon & Sons, Hollywell, Seaton Delavel*	186 18 5
G. E. Simpson	234 18 5		
J. McLaren	208 5 5		

EAST KIRKBY.—For three houses, Diamond-avenue, East Kirkby, for the Kirkby-in-Ashfield Co-operative Society, Ltd. Mr. Walter H. Woods, architect, land and quantity surveyor, Central-chambers, High-street, Long Eaton, near Nottingham. Quantities by architect:—

Tate & Sons	£759 10	A. W. Hoole, East Kirkby†	£680 0
Coleman	755 0		
Bains	741 0		

‡ Accepted price after deductions.

EAST KIRKBY.—For two pairs of houses, Welbeck-street, East Kirkby, for the Kirkby-in-Ashfield Co-operative Society, Ltd. Mr. Walter H. Woods, architect, land and quantity surveyor, Central-chambers, High-street, Long Eaton, near Nottingham. Quantities by architect:—

Tate & Son	£919 10	W. Bains, East Kirkby‡	£550 0
Coleman	900 0		
A. W. Hoole	869 0		

‡ Accepted price after deductions.

ELTHAM.—For painting and repairs at the Public Library, High-street, for Woolwich Borough Council. Mr. J. Rush Dixon, Borough Engineer, Town Hall, Woolwich:—

R. Gregory	£136 14 11	A. J. Ware	£62 9 6
Holland & Co., Ltd.	103 8 0	Kingston & Son	61 13 3
H. Harris	102 0 7	J. W. Ellingham	58 0 0
Beck & Pollitzer	95 0 0	Wiber & Co., Ltd.	58 1 6
J. Girdlestone	85 15 0	W. Sutch	53 9 6
W. H. Coates	80 3 0	C. & W. Barth	49 15 9
G. Bush	78 10 0	J. Moseley	48 11 0
King & Son	68 10 0	Stephens & Sons	45 0 0
E. Dyke	68 0 0	J. S. Fenn, 42, William-street, Woolwich*	44 19 0
Whistler & Worge	66 6 0	J. Hocking	43 12 6
A. H. Inns	65 10 6	Woollaston & Co.	42 0 0
W. Martin	65 10 0	J. J. Richards	41 4 5
F. W. Loasby	65 3 7		

[Borough Engineer's estimate (Mr. J. Rush Dixon), £85.]

GREENWICH.—For the construction of iron fire escape staircases to the Infirmary. Specifications and quantities by Mr. Louis Jacob, F.S.I., 32, Theobalds-road, Gray's Inn, W.C.:—

Mackenzie & Moncur, Ltd.	£714 13 2	J. Hall & Son, Ltd.	£477 16 4
Broomsgrove Guild	689 18 9	General Iron Foundry Co., Ltd.	473 3 2
J. & F. May	624 17 1	Jones & Co.	471 5 5
J. Bartle & Co.	573 6 3	St. Pancras Iron Co., Ltd.	461 13 9
Lift & Hoist Co.	571 11 9	Pierson & Co.	429 8 8
Newman & Manning	567 8 7½	Safety Tread Syndicate, Ltd.	428 16 6
Cadogan Iron Works	533 5 6	Lockerbie & Wilkinson, Ltd.	423 11 1
Kirk & Randall	520 0 0	Wenham & Waters, Ltd., Paragon Works, Croydon*	423 0 0
Herring & Son	512 9 8		
G. Aston & Sons	511 8 6		
F. A. Norris & Co.	488 0 0		
Haward Bros., Ltd.	478 9 9		

HARTSHILL.—For alterations and additions to the laundry block at the N. S. Infirmary, for the President and Governors. Messrs. R. Scrivener & Sons, architects, Hanley. Quantities by the architects:—

Colley & Lindop	£3,850	S. Heath	£3,339
W. Grant & Sons	3,725	T. Godwin, Hanley*	3,280
C. Cornes & Son	3,575	S. Wilton, jun.	3,200
J. Poole	3,499	Meiklejohn & Son	3,140
T. R. Yoxall	3,445		

HEAVITREE.—For road works, back roads between Monk's-road, Monkswell-road, and Clinton-road, etc., for the Urban District Council. Mr. F. E. Simpson, surveyor:—

G. Seller & Son	£92 15 0	T. Hooper, Heavitree*	£69 0 0
F. E. Sleeman	75 2 6		
J. Pulman	75 0 0		

HOMERTON.—For cleaning, painting, and repairing work at the Eastern Fever Hospital, Homerton-grove, E., for the Metropolitan Asylums Board. Mr. W. T. Hatch, Engineer-in-Chief:—

F. Sage & Co., Ltd.	£2,140 15 1	Barrett & Power	£1,487 0 0
W. Reason	1 967 0 0	J. S. Fenn	1,469 10 7
T. Carr	1,980 0 0	R. Woollaston & Co.	1,450 0 0
J. R. Johnston	1,846 0 0	L. Kazak	1,380 0 0
F. & G. Foster	1,798 0 0	W. Hussey	1,377 0 0
Woollaston Bros.	1,640 0 0	S. Squire	1,360 4 1
M. McCarthy	1,539 0 0	Vigor & Co.	1,286 0 0
B. E. Nightingale	1,526 0 0	A. H. Inns	1,246 8 10
		J. Oram & Son, Waltham Abbey*	1,191 16 9

KNOTTINGLEY.—For Holes improvement, for the Urban District Council. Mr. A. Hartley, Surveyor, Castleford. Quantities by Surveyor:—

J. Rodger & Sons	£1,060 1 2	E. A. Greaves	£1,022 19 0
Hannam & Co.	1,029 0 0	G. Clements, Featherstone*	884 2 7

LEWISHAM.—For cleaning, painting, and repairing work at the Park Fever Hospital, Hither Green, for the Metropolitan Asylums Board. Mr. W. T. Hatch, Engineer-in-Chief:—

J. T. Shorter	£2,453 3 9	A. H. Inns	£1,728 7 6
F. Sage & Co., Ltd.	2,385 15 1	L. Kazak	1,689 0 0
Woollaston Bros.	2,043 0 0	J. S. Fenn	1,652 18 3
W. Hussey	1,894 0 0	B. E. Nightingale	1,597 0 0
M. McCarthy	1,769 0 0	Vigor & Co., 15, King-street, Poplar*	1,387 0 0
S. Squire	1,748 14 6		

LONDON.—For alterations to the Bishopsgate Fire-station, for the London County Council:—

H. L Holloway	£900	J. & C. Bowyer, Ltd.	£827
W. Johnson & Co., Ltd.	875	G. Munday & Sons, 9, Botolph-lane, East-cheap, E.C.*	817
Higgs & Hill, Ltd	874		
F. & H. F. Higgs	840		

[Architect's approximate estimate, £800.]

LONDON.—For kerbing, channelling, foundations for asphalt paving, and roadwork in Desenfans-road, Dulwich, for Camberwell Borough Council. Mr. W. Oxtoby, Borough Engineer Town Hall, Camberwell:—

T. Wood & Sons	£563 13 11	J. Mowlem & Co., Ltd.	£458 0 0
E. & E. Iles	510 0 10	W. H. Wheeler & Co., Ltd.	448 9 11
Fry Bros.	482 13 8	A. L. Etheridge	439 19 2
T. Adams	472 11 0	G. J. Anderson, Poplar, E.*	437 10 3
H. Woodhams & Sons	462 10 10		
W. Pearce	461 3 8		

LONDON.—For the erection of a convenience for women at the Metropolitan Cattle Market, for the Corporation:—

F. Day & Son	£326 5	Sheffield Bros.	£295 0
C. P. Roberts & Co.	311 2	N. Lidstone*	290 0
W. Johnson & Co., Ltd.	298 0		

LONG EATON.—For house and shop, New-street, Long Eaton, for Mrs. E. A. Burton. Mr. Walter H. Woods, architect, land and quantity surveyor, Central-chambers, High-street, Long Eaton, near Nottingham. Quantities by architect:—

R. J. Warren	£567	E. E. Stevens	£534
J. Bull	554	Perks & Son, Long Eaton*	529
T. W. Youngman	554		
Brown & Son	538		

LOUGHTON.—For rebuilding a cottage at the Warren, Loughton, for the Corporation of the City of London:—

C. S. Foster & Sons	£402	H. W. Taverner	£361
R. Warriner	380	Sheppard Bros., Woodford Green*	335
A. Porter	365		

MEXBOROUGH.—For erecting six almshouses Church-street, for the Urban District Council. Mr. G. Fenwick Carter, C.E., Surveyor to the Council, Council Offices, Mexborough:—

Cliff & Smart	£845 18 4	G. H. Smith, Mexborough*	£675 0 0
Seagrove	656 14 0		

[Surveyor's estimate, £676 9s. 5d.]

OLDHAM.—For twenty-four houses, Hillside-avenue, Clarksfield, for the Equitable Co-operative Society, Ltd. Mr. F. Thorpe, architect, 7, Clegg-street, Oldham. Quantities by architect:—

Kent & Newton	£5,509	S. & J. Smethurst	£5,217
Thomas Bros.	5,470	Jarvis Bewley	5,130
J. Stamp	5,300	W. Foster & Sons, Oldham & Greenfield*	5,063
B. & J. Smith	5,300		
W. Whittaker & Co.	5,290		

REDDISH.—For new shelters, etc., at Reddish Recreation Ground, for Stockport Corporation:—

A. Moore, Stockport*	£493 10

ROWBARTON.—For erecting six houses in Leslie-avenue, for Taunton Co-operative Society, Ltd. Messrs. Sprankling & Price, architects, 16, Hammet-street, Taunton:—

R. Rendell	£1 770	H. G. Smith	£1,419
Lowe & Son	1,620	J. Maddock, Wood-street*	1,345
T. Rabjohns	1,475		
T. Manning & Son	1,425		

WELLINGBOROUGH.—For water supply works, Isham, for the Rural District Council. Messrs. Sharman & Archer, engineers, Wellingborough. Quantities by engineers:—

Contract No. 1.—Tower.

F. Marriott	£1,007 0	W. G. Wilmott	£785 0
E. H. Bate & Co.	886 10	Goodman & Murkett	784 0
A. P. Lewis	859 0	F. Langley	771 0
Hacksley Bros.	810 0	W. Thompson*	770 0
Brown & Son, Ltd.	795 0		

Contract No. 2.—Pipes.

Holwell Iron Co.	£478 7 8	Watson Gow & Co.	£449 11 5
Clay Cross Co.	466 9 3	Cochrane & Co.	440 13 11

Contract No. 3.—Fittings.

G. Aston & Co.	£85 14 6	Guest & Chrimes	£77 5 5
Glenfield & Kennedy	83 4 3	J. Stone & Co.	76 11 11
G. Waller & Sons	80 10 0	Lees, jun., & Co.	75 0 0
F. Bird & Co.	77 7 6	Blakeborough & Co.	75 0 0

Contract No. 4.—Laying Pipes.

Brown & Son, Ltd.	£595 0 0	E. H. Bate & Co.	£344 16 6
W. Thompson	435 0 0	F. Langley	278 0 0
Goodman & Murkett	356 0 0	W. G. Wilmott	273 0 0

Contract No. 5.—Tank.

Cochrane & Co.	£500 0 0	Highfield Foundry Co.	£314 2 8
F. Bird & Co.	358 14 6	Mather & Platt	273 16 0
Williamson & Co.	344 10 0	Gimson & Co.	238 8 4
Russell & Sons	327 0 0		

Contract No. 6.—Pumps.

Duke & Ockenden	£294 0 0
Shelby Manufacturing Co	253 17 0
E. & H. Roberts	219 9 9
C. J. Ell	197 10 10
W. Thompson, Section No. 1*	£770 0
W. Smart, Sections Nos. 2, 3, and 4*	779 6 } £1,549 6 0
C. Chamberlain, Sections Nos. 1, 2, 3, and 4	1,697 0 0
Mather & Son, Sections Nos. 5 and 6*	413 0 0

SHREWSBURY.—For erecting new secondary school, the Priory, for the Education Committee. Mr. F. H. Shayler, F.R.I.B.A., and Mr. J. A. Swan, joint architects, 16, Pride-hill, Shrewsbury:—

J. Barnsley & Sons, 102, Ryland-street, Birmingham	£14,444

WAKEFIELD.—For erecting a lodge on the St. John's Estate, for the Governors of the Wakefield Charities. Mr. W. Wrigley, A.R.I.B.A., 2 King-street, Wakefield:—

Builder: A. Turner, Wakefield*	£179 10 10
Joiner: W. Loyd, Wakefield*	125 16 1
Plumber: J. Woodhead, Wakefield*	45 5 11
Tiler: S. Atkinson, Wakefield*	24 17 0
Plasterer: H. Sanderson, Ossett*	40 19 7
Painters: C. Turner & Sons, Wakefield*	7 5 0

WEST HERRINGTON.—For Penshaw district water supply, extension of mains, for Houghton-le-Spring Rural District Council. Mr. W. Morley, Sanitary Surveyor, Sunderland-street, Houghton-le-Spring:—

J. C. Hale	£406 7 6	J. G. Rutter & Son	£308 16 0
J. Hope	351 5 0	R. Hudson & Sons, Sunderland*	293 4 0
G. H. Thompson	323 18 4		
J. Carrick	312 10 0		

YEOVIL.—For new premises, for Yeovil and District Co-operative Society, Ltd., 86, Middle-street, Yeovil:—

Coles Bros.	£2,460 12 3
W. Wallbridge	2,250 0 0
J. W. & H. Childs	2,234 0 0
C. Bryer, jun., Bridgwater*	2,170 0 0

TIVERTON.—For two concrete service reservoirs, etc., for the Borough Council. Mr. J. Siddalls, Borough Engineer, Town Hall, Tiverton:—

—	Concrete Reservoirs.	Reinforced Reservoirs.	System.
	£ s. d.	£ s. d.	
Brebner & Co.	4,032 11 2	—	—
Wakeham Bros.	3,952 0 9	—	—
T. Relf & Sons	3,444 1 6	—	—
Playfair & Toole	3,319 0 0	2,584 0 0	Hennebique.
J. & W. Stewart	3,248 2 1	—	—
S. Ambrose	3,228 13 2	—	—
Hobrough & Co.	3,049 3 7	2,181 5 10	Hennebique.
H. Berry	2,988 10 8	1,978 0 10	Expanded Metal.
Moss & Sons	2,981 5 8	3,243 14 6	—
Steer & Pearce	2,933 16 10	2,692 17 0	Kahn Bar.
H. Drew	2,883 0 0	2,340 0 0	Kahn Bar.
Pethick Bros.	2,765 0 0	—	—
H. V. Smith & Co.	2,719 15 0	2,094 19 10	Hennebique.
G. Pollard	2,716 0 1	2,216 0 1	Indented Steel Bar.
W. Shaddock	2,687 1 7	—	—
Mitchell & Sons	2,440 8 3	1,862 6 6	Indented Steel Bar.
Greenwood & Sons	2,405 1 3	2,013 12 8	—
E. G. Coles, Taunton	†2,278 13 5	—	—
Reinforced Reservoirs without General Work.			
E. P. Bovey		1,390 0 0	—
Reinforced Building Co.		1,368 14 11	Perfector Construction.
Byard & Sons		1,338 0 0	Indented Steel Bar.
Yorkshire Hennebique Co.		1,138 10 0	Hennebique.
Wilkins & Sons		1,043 15 0	Perfector Construction.
Lambrick & Co.		920 0 0	Hennebique.

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